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HUGH ARCHBALD





# CONTENTS

	PAGE
ACKNOWLEDGMENT .....	v
INTRODUCTION BY BUREAU OF INDUSTRIAL RESEARCH.....	xi
FOREWORD .....	xv
I. GRIEVANCES .....	i
Persistence of industrial difficulties .....	i
1919 demands .....	2
1913 Colorado demands .....	6
Olden days .....	7
Employers' grievances .....	10
Statement of facts .....	15
Grievance of the public .....	16
II. COAL MINING .....	19
Physical description .....	19
Terminology .....	21
Diagrams of layout .....	22, 24
III. THE MINE FOREMAN AND HIS PROBLEM .....	35
Mining laws .....	36
The mine boss's visit .....	40
Transportation .....	43
Measuring Day .....	51
IV. TIME FOR THE MINER .....	53
Idle time .....	53
Tables of working time .....	57-59
Supply of cars .....	62
Average full time hours—tables .....	64-66
V. AMOUNT OF WORK FOR THE MINER .....	69
Ohio production .....	73
Pennsylvania production .....	73
Kansas production .....	75
Kansas tables .....	76, 77
Washington production .....	78
Time involved .....	79
How much work is possible .....	80
Percentage tables .....	82-85
Diagrams of curves of pick and machine mining....	86, 87

	PAGE
Diagrams of percentage of miners .....	88, 89
Diagram of classification by output .....	90
VI. RECORD OF COMPLAINTS IN ILLINOIS .....	93
Compensation of company men .....	94
Grievances of miners .....	95
Lost time .....	96
Faulty place .....	99
Miscellaneous compensation .....	100
Contrast between slack and full work .....	100
Working conditions .....	102
Fining .....	106
VII. DISCOURAGEMENTS AND THE LACK OF THRIFT.....	111
Majority report, Bituminous Coal Commission.....	111
Underlying philosophy .....	115
Over-equipment of men .....	116
Payment for work .....	117
Tables of average earnings .....	121-23
VIII. THE ENGINEERING NEED .....	129
Growth of a mine .....	129
Isolation .....	132
Profits .....	135
Over development .....	136
F. G. Tryon's statement .....	137
Quotation from Edwin Ludlow—Proceedings of American Institute. M. & M. Engineers.....	145
Quotation from Majority Report—Bituminous Coal Commission .....	145
INDEX .....	147

# CHARTS AND TABLES

	PAGE
Layout of openings of a mine .....	22
Sketch of a working panel .....	24
Percentage of present full-time output produced in the United States by all bituminous operators making weekly reports .....	57
Working time at bituminous coal mines during week end- ing August 20, 1921 compared with corresponding week in 1920 .....	58
Percent of bituminous coal employees working each specified per cent of full time by groups of occupations.....	59
Average full time hours; hours of operation of mines, and hours worked by employees in bituminous mines:	
Miners, hand .....	64
Miners, machine .....	65
Loaders .....	66
Average number of days mines worked and average number of short tons produced per miner .....	76
Average number of short tons per miner per day for thirty mines .....	77
Relation of percentage of total number of men to percent- ages of total production:	
Pick mine .....	82
Machine mine .....	83
Pick and machine mine .....	84
Equal turn clause mine .....	85
Curve showing relation between percentage of output and percentage of miners:	
I. Pick mine .....	86
II. Machine mine .....	87
III. Pick and machine mine .....	88
IV. Equal turn clause mine .....	89
Comparison between the outputs obtained from the miners is four mines .....	90

## CHARTS AND TABLES

	PAGE
Average daily and monthly earnings of mine employees by occupations:	
(A) Freeport thick vein district .....	121
(B) Pittsburgh thin vein district .....	122
(C) Fairmont, West Virginia district .....	123

## INTRODUCTORY NOTE

The mining lamp set in Mr. Archbald's cap, above his engineer's brain, has been brought to bear for twenty years searchingly on every detail in and around the mines. With it he pores through the statistics which are a by-product of the mining industry, the volumes on grievances, the acreages of investigation reports; then his light dips down the mine shaft again and illumines the contrarinesses of space and time which drive the diggers to rebellion. All he tries to do is to record who works and how and where and when and why, what happens and what fails to happen. The simple audit of work becomes the picture of a national mess.

Why the mine foreman hustles, hustles by state law; why he says "about" and "I guess" and how those words mean trouble to isolated diggers; how he struggles with a railroad whose terminal won't stay put; why brains in the colliery office are not worth the money; why it is the manager's back which the miner finds himself facing; how a piece of pie may fetch another mine car; why it pays a miner in hard cash to ignore loose rock above his neck; why the miner can get into the mines only two to four days a week; why, when he gets in, he can average only three to four hours' work, paying work, a day; just why the number of mines in the country creates mean living for the family of the miner; how needles and skyscrapers cost more when mine engineers fail to compute mine cars in terms of mine men;—a plainer general understanding of the things in this study makes for less uproar in the newspapers, fewer riots and troops and tribunals, less starving and dying.

The miner is a piece-worker; in the fraction of time which the mine affords him he must earn enough for a family for a year. "Equal to time lost through seasonal operation comes time lost through underground mismanagement." This root of the evil is grubbed out thoroughly in this volume, apparently for the first time.

For one hundred and fifty years, the author notes, mining grievances have been the same. The complaints of the public,



of the managers and of the miners of today are repetitions of the discontents of decades ago. Mining has not changed. Is this because the same objective—to make money—has governed and this government eternally conflicts with the same sorts of wetness or heat, thickness or thinness, hardness or softness, depth and darkness in the unchangeable coal veins? The organization of work, to surmount the hard conditions, is governable but it doesn't get government.

And, surprisingly, the engineer proves that the warring employer and employee often are blind to the real causes of their ancient disputes. The owners simply don't go into their mines; the miners—well, Mr. Archbald tells an incident not in this book. "I knew from medical sources the normal state of miners' lungs. One day I lined up a dozen old-timers, bosses and miners, and we measured chest expansions. I had the usual three and one-half inches. At first, not one of those husky men could expand his chest over one inch. They were dumbfounded. They punched my ribs and themselves and tried and tried. One of them finally got up to an inch and a half." You will hear miners say, "Gee, how I can spit up black." But they don't realize how their lungs, because of work in a stooped posture and in coal dust, have abnormally small breath capacity. Many things in mines are as invisible as those lungs.

This mining engineer has not gone hunting trouble or taken miseries for a life work. But he carries a lamp at his daily work and by it, as he taps the mine roof, counts props and times the passing cars, we notice that "mining makes a miner black," that the way coal now gets out of the ground means a tremendous total of human distress, in the earth and on it. The distress is measurable and largely controllable.

What the soft coal industry has drunk of too deep is competition. Beneath the feet of owners, whose eyes are fixed earnestly on where the money comes from, over-development has blighted the places where the coal comes from. Bituminous coal has run wild: (anthracite mines, now under monopoly control, have carried over the characteristics of their earlier phase and, in lieu of real engineering underground, breed the same sorts of grievances).

The consequences of over-development are the meat of this

study, consequences in human frustration in the mines and in public costs felt in homes thousands of miles from the mines. Over-development, with its accompanying disregard of planful engineering, lies at the bottom of a mining system which offers the miner, who may be eight hours underground, an average of four hours' actual chance at hard, paid-for brute labor. The public's payment for such waste gets to be monumental.

Assaying what is, what he has laid lamp and hands on for twenty years, the engineer stops; he puts no yardstick to possible reconstructions or revolutions. To the government authorities, to the run-of-mine managers and to the consuming public he makes plain the folly of such theories as "the miners won't work." The wonder is that the sons of generations of mismanagement should work with such energy, (the American miner's average daily output being three and three-quarters times as much as the British miner's); the real wonder is that our "restless" miners remain so extraordinarily quiet.

Management has not been their province, hitherto, let alone reconstruction. Present contracts between owners and union bar miners out of any concern with management. In a typical Scale Agreement, signed by operators and by officers of the union, Rule 4 provides that the miners' Mine Committee shall not "exercise any control nor in any way interfere with the operation of the mine" under penalty of removal. Rule 15 provides that "the management of the mine and the direction of the working forces are vested exclusively in the operator, and the United Mine Workers of America shall not abridge that right." If blame for the past rests on the miners it is the blame of having submitted to this rule of the owners.

In the following pages the miner is only a miner, a human being digging coal, not a human being struggling in a labor movement. But the miners in the labor movement, who are now planning out the nationalization of coal mines, may decide the future of the coal which underlies our civilization and they will have to grapple with the same problems of the engineering of work here set forth. Theirs is the next move. The engineering mind, damned by things as they are, waits for its chance at the hands of those who can see and can build.

March, 1922.

BUREAU OF INDUSTRIAL RESEARCH.



## FOREWORD

There is an old catch which, if you have never tried, you can try on the person next to you, or even, if you are alone, upon yourself. Ask someone to tell you, without looking at his watch, whether the numerals on its face are Arabic or Roman, and whether the numeral six is right side up or upside down.

The answers which you will get will show you how easy it is to see and yet not to see a common thing.

There is no deep mystery in coal mining. It is simple work. To be sure, the darkness underground is baffling. The whole work in the twisted turnings cannot be seen at one glance. In that ant-hill parts have to be put together in imagination even by the man who works underground. But many a thing which is seen every day is unknown even to the miner, let alone the stranger.

Try the question.





## CHAPTER I

# GRIEVANCES

The industrial troubles of coal mining have been the same for a hundred and fifty years.

There have been ever recurring organizations of workers in the mines and ever recurring strikes with similar demands by the men and similar opposition by employers. Are there natural conditions surrounding coal mining for which no one in particular is to blame, which create such a character of underground work as to cause continued discontent? Let us examine these conditions and analyze the underground work of coal mining in order to show the how and why of industrial trouble, that the way out may be more easily discovered.

To the outsider coal mining is as mysterious as a tomb. Mines do not exist where they are matters of every-day observation. Even those who pass their lives on top of coal mines have only hazy ideas of what the inside of a mine is like. It is not a place which can be known from photographs for sunlight has not existed for millions of years in the places where the coal now lies. Yet an army of men labor underground producing the economic basis of modern life.

Coal has been increasing in importance for several centuries, but its present day importance began with the invention of the steam engine and the application of power to manufacturing a century and a half ago. It was then that modern mining began. Today coal is more important than ever before and the consumption of coal has reached a point where it affects everybody.

During this century and a half steadily increasing changes have been made in the mines, but these have been more in the size of mines and the depth to which they are carried than in mining methods. Mining is still craft work. Cutting the coal, blasting it down, cleaning it of refuse, the laying of track, the standing of timber, all the work to be done in one working place, still remain practically the work of one man who makes a finished

product. The machinery that has been added to mining allows more craftsmen to be employed in one group but it leaves them craftsmen; it is mostly machinery for handling a finished product in large quantities, not, as in factories, demanding the division of the craft into a large number of minute operations. It is because the essential craft basis of coal mining has not changed, nor the location of mines and consequent conditions surrounding mining, that the same grievances of the workers come to the surface year after year.

Every one engaged in coal mining has been a victim of the circumstances under which he has found himself. The worker, though expending his effort upon the coal itself, has not been able to pass on any of his troubles. Like the private in the army, he must carry on. He has been the one to revolt.

It was Bill Jones from the county of Northumberland in England who after talking over the grievances of the men at a time of trouble, explained about himself. "You see I was what you might call raised in the mines. I started in in the old country when I was nine years old and I am over fifty now. These foreigners, they weren't raised in the mines, they were farmers and can work in the garden or build walls or work on the road. Me, I don't know nothing but mining."

It is with work underground that we are primarily concerned. For there it is that the actual work of coal mining is done. But for a proper understanding it is best to begin with some expressions of the troubles, not alone of the worker but of the employers and representatives of the public as well.

#### *Grievances of the Mine Worker in 1919*

The grievance of the worker roots in the necessity he is under to earn his living and in his desire to live decently. The demands which he makes at the time of strikes do not tell the whole story. They hardly can. For the demands must express the wants of a number of men; must be so expressed that they satisfy many varying individual wants. They must be broad enough to unite many men in action. What the common grievances of the whole class of mine workers actually are can be worked out by comparing the various demands which have been made through their union.

Typical general demands are those presented before the

Bituminous Coal Commission of 1920 appointed by President Wilson to arbitrate the trouble which came to a head throughout the coal mines of the country on November 1st, 1919. The demands of the men as set forth in the report of this commission are as follows:

1. That there be a 60 per cent increase upon all classifications by day labor, tonnage, yardage, and day work in the central competitive field. That, of course, carried with it that the basis of understanding reached in the central competitive field on the part of the mine workers would be satisfactory in all outlying coal-producing districts.
2. That a six-hour day, five days per week, be established.
3. That the day labor be paid time and a half for overtime and double time for Sundays and holidays.
4. That pay days shall be upon a weekly basis.
5. That the double shift of work on coal for commercial tonnage be abolished.
6. That the automatic penalty clause be abolished.
7. That the internal differences not covered by interstate joint agreement shall be referred back to the representative districts for adjustment.
8. That any contract negotiated be in effect from and after November 1, 1919, to run for a period of two years from that date.

If it is assumed that these demands are placed in the order of importance, then the first demand, which concerns earnings, is the most important. In the consideration of the demands by the Commission, this one received most attention. In addition to the first demand, which concerns wages, the third also has as a basis the earnings of the men. It is a combination demand which affects organization of work as well as earnings, a demand for extra reward for doing work outside of regular hours so as to prevent men from being called upon at these holiday times. The second demand for a five-day week and a six-hour day, is one that affects the organic structure of the industry as a whole. It was an attempt on the part of the men to get away from the irksome and demoralizing condition of intermittent work. Based on the fallacious assumption that a shortened day would check the over-expansion of the industry, it nevertheless was an attempt to get steady work throughout the year and stabilize the operation of mines.

In addition to the demands concerning working time, there

is another which affects the organization of work, the demand for the abolition of the double shift in mining coal for sale alone, it should be noted, not for its abolition where the purpose is to extend the working places so that more men can be given work. The last three of these demands (6th, 7th and 8th) concern features of the collective contracts involving discipline and the administrative procedure under the contract.

The demands have three elements; first the matter of earnings, second, the matter of the organization of work, and third, the contract between employers and employees.

The commission of three members in arbitrating failed to reach a unanimous decision and a minority report was submitted by the representative of the men. The essence of their complaint as set forth by Mr. John P. White, representing the miners, is:

"We are weary with long years and generations of mere existence. We wish the opportunity to earn a wage which will command a human standard of living and hold out hope for the future."<sup>1</sup>

In these demands of the mine workers, there is none which goes outside the work, to matters of life and living, to houses and stores and living conditions, things which affect a workman after work is over. It was earnings the men wanted, with the better organization of work as a secondary consideration to the matter of earnings. Possessing earnings the men felt able to care for themselves in other matters.

To every mine boss will come an appeal for a change of work:

"Mr. John, you give me place Meadowbrook."

"What's the matter with your present place? You are getting \$1.44 a car."

"Yeh, me no can make money. Me work like Billy Hell."

"No, I can't do it. Anyway it's pillar work up there. You don't know anything about pillar work."

"Sure, me work pillar."

"It's too dangerous for you."

"Sure, me know."

"You have to stay in all day with your laborer. Can't go home early."

"Sure, me know. You see."

"You only get \$1.06 a car up there."

"Sure, me know. Me try. You see."

<sup>1</sup> United States Bituminous Coal Commission, Majority and Minority Reports to the President. 1920. p. 80.

Meadowbrook—danger—lower rate—wanted to go—why?

The mining made it necessary to have disciplined work and the total earnings of the men were high.

That men do not care so much *how* they work as *what* they receive is shown in an italicized part of Mr. White's minority report, in which he discusses the interrelation between earnings and days of work: "The majority report has carefully provided that labor shall be paid on the supposition that it works an average forty-eight hour week, and the public will call it a fair wage on that basis. The difference between the hypothetical forty-eight hour week and the actual average thirty-hour week represents a part of the year for which the majority report makes no provision so far as labor is concerned. On the other hand, it ignores the fact that the nation is called upon to pay profits and maintenance to capital on the basis of its normal employment being a thirty-hour week. Capital is to get its full normal remuneration, although it works but thirty hours a week on the average. That is to say the majority report tacitly awards the companies a thirty-hour week while denying it to the mine workers."<sup>1</sup>

Another passage in this same minority report distinctly relegates the organization of work to a secondary position by the inclusion of the word "almost":

"Increase in earning power of the mine worker is *almost* as dependent upon his securing a greater and more regular opportunity to work and to earn as it is upon an increase in his rates of pay."<sup>2</sup> The sentence following this one, might be taken as summing up the greatest grievance of the mine worker as *understood by them* in their most recent troubles: "With inadequate rates of pay in the face of lack of opportunity to work, the position of the mine worker has grown desperate."<sup>3</sup>

In expressing their demands the men give them a negative character; they demand that they shall *not* be denied the standard of living which they desire or that this or that feature of the conditions of their work shall not be continued. For it is easier to get men to combine for the abolition of some tangible thing

<sup>1</sup> Ibid. p. 35.

<sup>2</sup> United States Bituminous Coal Commission, Majority and Minority Reports to the President. 1920. p. 88.

<sup>3</sup> Ibid, p. 88.



that has annoyed them, than to fight for a thing which they see to be good only through the use of their imagination.

*Colorado in 1913*

In Colorado in 1913 the United Mine Workers made the following demands upon the operators:

1. We demand the recognition of the union.
2. We demand a 10 per cent advance in the tonnage rates, and a day wage scale practically in accord with the Wyoming day wage scale.
3. We demand an eight-hour working day for all classes of labor in or around the coal lands and at the coke ovens.
4. We demand pay for narrow work and dead work, which includes brushing, timbering, removing flaws, handling impurities, and so forth.
5. We demand a check weighman at all mines to be elected by the miners without any interference by company officials in said election.
6. We demand the right to trade in any store we please, and the right to choose our own boarding place and our own doctor.
7. We demand the enforcement of the Colorado mining laws and the abolition of the notorious and criminal guard system which has prevailed in the mining camps of Southern Colorado for many years.

It was the operators' opposition to these demands which led to civil war in 1914 and the calling out of Federal troops. Examining these we find that they too fall into three broad classifications; first, the protection and assurance of strength in bargaining power which recognition of the union gives; second, earnings—the actual rates to be paid, the hours to be worked—the payment for all work incidental to mining—and that there shall be no short weight; and third, guarantees of freedom and protection of life itself.

In these demands there is a similarity in sequence to those which were made on November 1, 1919, and which covered the bituminous regions where the United Mine Workers are recognized. In the latter there was no question of union recognition; it was the union that presented the argument for the men before the President's Commission. In Colorado in 1913, the companies were refusing to negotiate with the mine workers' organization and so recognition of the union in establishing scales and conditions was given first place.

The second of the Colorado demands is like the first demand of the organized miners in 1919. It is for earnings—increased rates of pay. The third, like the second in 1919, concerns hours of labor. The fourth Colorado demand relates to pay for things incidental to coal mining, while the third 1919 demand is for pay for overtime. The fifth, sixth, and seventh Colorado demands specify things peculiar to the Colorado situation and which were not held as grievances in 1919 in the Central Competitive field.<sup>1</sup> They had been fought out in days gone by so that although they may still exist as grievances affecting a few men, they were not sufficiently general to stir large numbers to united protest.

Long existence in the Central Competitive field of collective contracts between the employers and the union had developed the making of contracts, including clauses to promote their effective operation into an accepted formal procedure so that grievances could be aired in 1919 in connection with the negotiation of a new contract, which could not find vent in Colorado where no contract had existed before. Hence there are fundamental differences in the last demands presented in the two cases. However these differences take a secondary place to the common question of earnings.

In Colorado, with the mines even more isolated than the mines in the relatively thickly settled eastern states, the men were more dependent upon the companies and their special grievances grew out of that isolation. The workers were demanding rights which are ordinarily accorded—assurance that they were given credit for full weight, since they are paid by the ton, the right to trade where they pleased, the right to have the doctor of their own choice, to have the law enforced and to be governed only by officers of the law. In that fight for rights the men had a moral cause which gave them a strength among the public that a bargaining for earnings only would never give and which resulted in congressional and other investigations.

### *Olden Days*

It is highly significant that these same grievances run through the history of the industry since the beginning of mining, that

<sup>1</sup> The Central Competitive field comprises the bituminous areas of Western Pennsylvania, Ohio, Indiana and Illinois: agreements made in this field are the basis for other bituminous agreements.

the same complaints come up again and again. In their vivid study of *The Skilled Labourer*, J. L. and Barbara Hammond give an account of the miners' strikes in England between 1760 and 1832 and the grievances which provoked them. In an account of a strike in 1765 there is the following:

"It is interesting, to notice from the newspapers of the time that the question of government interference to settle the wages was raised. Why should not the Privy Council intervene before the meeting of Parliament? 'It is imagined there would be no greater difficulty to settle these unhappy men's wages than it was to fix a price for the labour of the journeymen tailors.'

"A striking feature of the accounts of this episode in the Press is the sympathy shown to the miners. The local papers indeed give no comment, but the London papers—and London was seriously affected by the shortage of coal, which went up from 30s to 40s a chaldron—published many letters from the district, showing that the men had public opinion on their side. What is perhaps most remarkable is that protests were made against the employment of the military. 'Impartial people,' ran one letter, 'think the masters have brought this upon themselves, by endeavouring to break through an old custom; however, in a country which boasts its liberty, it is an odd way of deciding differences between masters and servants by Dragoons.' Again, 'The sending of a body of troops against them (the pitmen) is a measure but little approved by the considerate part of the people; everybody thinks that some expedient to reduce the price of provisions, would have been the best means of quieting the tumult; and many persons say, it is rather an extraordinary circumstance to knock a set of poor men on the head, because they will not quietly submit to be starved.'

"The conditions of the colliers' lives and of the hardships under which they suffered were described in some detail and with much feeling in a letter published in two London papers by a certain Richard Atkinson during the strike. This letter is particularly interesting because it shows that the familiar charge of extravagance was levelled against the miners even in these early times. Mr. Atkinson's indignation had been roused by the masters' assertion that the troubles were due to laziness and not to distress. The men's wages he tells us are 7s a week. 'Cut off from the light of heaven for sixteen or seventeen hours a day, they are obliged to undergo a drudgery which the veriest slave in the plantations would think intolerable, for the mighty sum of fourteen pence.' Further, they cannot spend even that sum as they like, for the overseer, appointed by the proprietor to keep the men to their duty, and to pay them their wages 'constantly keeps a shop contiguous to the pit, where he lays in every necessity both for the belly and the back, and obliges the poor men to buy whatever they want from him, stopping it out'

of their wages,' and keeping them constantly in his debt. 'Such, Mr. Printer,' he exclaims, 'is the real situation of the colliers. To be sure it is the business of the proprietors to represent them as a set of lazy, disorderly fellows, who want only to increase their wages for the sake of extending their extravagancies; the more they are kept down, the more their masters will be enabled to venture ten thousand guineas on a favourite horse, or the accidental turn of a card. But the sensible part of the kingdom, who will always judge for themselves, must immediately see, that when butter in the northern parts of England is at sixpence and butcher's meat at threepence a pound, a man who has but seven shillings a week to support himself, a wife, and four or five children, can have no mighty matter to squander away at an alehouse, or at any other place of recreation, which happens to agree with the casual bent of his inclination.'"

Here we have again the question of wages coming foremost, followed by the question of civil liberty such as it appears in the third set of demands made by the Colorado miners in 1913.

One may smile at the old English sentences but one cannot fail to be struck by the similarity to the present day (1921) in our own country where Federal troops are employed to quell grievances. The comment of Richard Atkinson is still arresting,—"in a country which boasts its liberty, it is an odd way of deciding differences by Dragoons."

One other quotation from The Skilled Labourer deserves to be made because it illuminates the conditions surrounding the presenting of grievances, the fact that almost a century ago appeals to the courts were made and violence was incident to the miners' struggles. It is a letter from Lord Melbourne to the Magistrates of the county of Durham in England, giving the rate of wages as the first grievance, then the hours of work, then the amount of work to be done and lastly "other regulations relating to the conduct and management of their trade." Note the similarity of the demands and their sequential emphasis to the demands of American miners almost a century later:

"Whitehall, July 16, 1832  
"Sir,—I am commanded by His Majesty to call your most serious and immediate attention to the state of the colliery districts in the county of Durham.

"It appears that, for some time past, extensive and determined combinations and conspiracies have been formed and entered into by the workmen, for the purpose of dictating to their masters

the rate of wages at which they shall be employed, the hours during which they shall work, the quantity of labor which they shall perform, as well as for imposing upon them many other regulations relating to the conduct and management of their trade and concerns.

"In pursuance of this system, and in furtherance and support of these demands, which are as unwise and injurious to the authors of them as they are violent and unjust in themselves, tumultuous assemblages of people have been gathered together, to the great danger of the public peace, at which the most seditious and inflammatory discourses have been delivered, and the most illegal resolutions adopted.

"The natural consequences of such proceedings have shown themselves in outrages of the most atrocious character, in menaces and intimidation, in the injury and maltreating of peaceable and industrious labourers, so as to endanger their lives,—and in the commission of murder in the face of open day.

"In these circumstances I am commanded by His Majesty to express his confident expectation, that all who hold commission of the peace will act with the promptitude, decision, and firmness which are so imperatively required, and they will exert themselves for the prevention and suppression of all meetings which shall be called together for an illegal purpose, or which shall, in the course of their proceedings, become illegal; for the detection and punishment of all unlawful combination and conspiracy, as well as all outrage and violence; and for the encouragement and protection of His Majesty's peaceable and well-disposed subjects. —I have the honour to be, sir, your humble servant,

Melbourne."

After one hundred and fifty years of coal mining we have not learned how to remedy the causes of grievances. And one is tempted to question any person advocating that we as a people go back to "good old days" which the passing years have colored with legends. Shall we go back to the days of 1832 in England or 1765 or to the days when modern factories did not exist, to Evil May Day in London in 1517 when four hundred strikers were condemned to death—nine of whom were actually hanged?

### *Grievances of Employers*

The main grievance of the employer is of the same nature as that of the employee. With the employer, too, it is a question of earnings. If business conditions cripple his earnings, that is a grievance to be remedied. If employees demand more money



in wages and threaten to decrease the employer's earnings, that again is a thing to be resisted.

For an employer is a piece worker just as much as any miner in the mines who is paid by the ton of coal which he shovels into a mine car. The miner physically handles the ton of coal. The employer never touches the coal itself, but by investing money in land and equipment, earns profit through organized work, taking his pay in a fraction of what the purchaser pays for the coal. He works in a complex situation while the individual employee works in a relatively simple one.

The main attention of the employer is fixed in the direction from which the money comes. It always has been; it always will be. There is nothing inherently wrong in that. To the employer the workman is the secondary, the purchaser the primary consideration. The money which comes in to the employer flows out toward the employee and the employer earns money when this is only a part of what comes in. The amount of actual wages paid to employees is not a vital concern to the employer so long as the money coming in is in satisfactory excess of the amount going out.

As a consequence of this natural direction of attention to the market, one of the hardest things in life is to get an employer to make an about-face and consider the conditions under which his employees work, consider the organization of the work and its effect upon the employees. Contrariwise it is easy to get him to consider everything which is going to affect a customer. It is easy to get an employer to advertise but difficult to get him to invertise.

And the employee does not realize that he is always looking at his employer's back—not at his face.

### *No Man's Land*

When one examines the public expression of grievances of employers, one finds that just as the workers omit complaints against the organization of work, so too it is omitted in the responsive complaints of employers. In private conversation with employers one is more than likely to have to meet the argument: "They are getting their pay, why should they worry over how they do it." And yet it can be shown that the conditions under which one man may work will irresistably and unconsciously result in poor work being done by them all. For as no man works

to himself alone, poor work on the part of one man, is more than likely to drag many others into poor work. As a rule the employer lacks a detailed knowledge of the conditions under which the men are working. This is because his attention is set in a different direction and he deals with total pecuniary results. There exists a No Man's Land between the workers who do not understand how the organization of work affects them and know only the total result that their earnings are not what they wish them to be, and the employer who must deal with totals of a different sort. It is into this field that I wish to take you exploring.

The public reads the many complaints against the miners until, if one happens to talk about coal mining with a person who is unacquainted with it, one is fairly certain to hear "the trouble is the men won't work." It is not with the desire to promote a partiality in favor of the men who go down into the mines, that one asks, can six hundred thousand men, mixed population, scattered over many states, differ in fundamental character—in industry and honesty and strength—from any other body of men?

Why is it that for one hundred and fifty years the grievances of employers have been the same? Richard Atkinson, writing in 1765, evidently in response to a statement that the men would not work, said that "it is the business of the proprietors to represent them as a set of lazy, disorderly fellows, who want only to increase their wages for the sake of extending their extravagances."

Out of the many current accusations against the miners, one such, which appeared in the New York Times on November 26, 1919, is in part as follows:

#### "Assert Few Men Work Steadily"

"In connection with the earnings of the men under the present scale, it should be quite clearly understood that only about 20 or 25 per cent of the men work steadily. A recent report of the United States Bureau of Labor Statistics shows that pick miners in 1919 were earning only 84.5 per cent of the amount they could have earned if they had worked steadily during the days the mines were offering them work. It shows further that the loaders after the machines, who comprise the most numerous class of employees, earned only 80.4 per cent of what they could have earned had they worked steadily on the days when the

mines were offering them work. The pay-rolls of the mines disclose the fact that the employees who work steadily in any mine are regularly earning from \$175 to \$250 per month, while in many cases individual employees are earning from \$300 to \$400 per month."

"The official figures of the Department of Labor show that the men can increase their earnings from 15 to 25 per cent merely by working steadily on the days when the mines are running."

"Every mine wage increase granted since 1916 has resulted in decreased efficiency of the miners and increased voluntary idleness on their part. The production per day per man has steadily declined with the advancing wages, and this in spite of the fact that the mechanical facilities for increasing output per man have been steadily improved."

Employers always point to their best men to show what a workman can do. Another statement which also appeared in the New York Times on November 26, 1919, during the days of the great strike, is as follows:—

"Says Miners Get \$1 an Hour"

"West Virginia Coal Operator Replies  
to McAdoo's Charges"

"J. G. Bradley, President of the West Virginia Coal Association, replying last night to former Secretary McAdoo's statement, produced figures from the pay rolls of union mines in Kanawha district purporting to show that miners were getting more than \$1 an hour for an eight-hour day.

"Mr. Bradley said that many of the men, because of the high wages they earned by working three or four days a week, were 'idle more than 30 per cent of their available work time.'

"As a sample of the pay of the miners in the West Virginia field, Mr. Bradley submitted a table of the compensation paid to machine loaders and runners for the month's period between September 15 and October 15 of this year, based on an eight-hour day. It follows:

Miner.	Days worked	Earned	Day's pay
Albert Kinney	27	\$204.76	\$ 7.84
J. Thompson	27	195.58	7.39
W. Whitlow	26	236.47	9.09
S. Phelps	26	421.63	16.22
J. Edwards	30	346.30	11.54
Dave Sherburn	30	373.83	12.46
M. Bowles	29	356.58	13.21
N. Robinson	29	354.28	12.22
Robert Lindsey	29	340.66	11.75

"Mr. Bradley asserted that the miners probably felt the advanced cost of living less than any other type of labor. He said that the miners obtained houses, heat, fuel, and doctor's treatment at greatly reduced prices through the companies. According to Mr. Bradley the average miner, after paying all his expenses, usually had 50 per cent of his month's pay left to save or spend."

These are figures characteristic of the boom period just before the strike of 1919 and of the year 1920. How shall one account for the fact that Phelps, who worked only 26 days, earned \$16.22 a day, while Kinney who worked one day more, earned only 49 per cent of what Phelps earned—only \$7.84 a day,—for the entire month, \$216.87 less. Or again, why did Edwards earn only \$11.54 a day though he worked 30 days during the month and why were his total earnings only 82 per cent of the earnings of Phelps; 115 per cent of Phelps' time for 82 per cent of his earnings.

Such a statement lacks a standard of measurement for the amount of work done by each man. If such a standard were given, it might so happen that he who worked the longer time and drew the least money would be found to have put the most energy, mental and physical, into his work.

Evidently something more than mere attendance at work is required to enable a miner to earn money. Something must happen after a man gets under ground which affects his earnings, although the inference in the statements of the operators is that the men in the mines would earn more if they simply worked more. Perhaps there is something in the organization of the work which induces irregular attendance. Those who have been in daily charge of mines know that irregularity does exist and they know that irregularity in attendance is greater among the miners who are piece workers than among the company men who have an assurance of certain work with certain pay.

Operators are more likely to have grievances toward the public than workmen, and, having relations with the government, to have grievances against that combination of all men.

Contrary to popular belief, particularly in bituminous coal mining, the margin of profit during most of the past years has been small. C. E. Leshar in a speech before the American

Economic Association in December, 1920, sketches briefly the conditions surrounding the appeal of certain operators.

"Today it is, and for thirty years has been, a case of each shipper for himself and the devil take the hindmost. The past four years have been profitable for the coal trade, but for this the coal man can claim no responsibility. Conditions absolutely outside his control have given to coal a remarkably steady market at good prices, the four years considered as a whole. It is, however, not hard to speculate as to what would have been the position of the bituminous coal industry if in 1914 the war had not affected conditions so fundamentally."

#### *Statement of Facts*

"In a Statement of Facts issued December 1, 1914, or six years ago, the operators of Illinois and Indiana set forth for the President of the United States and the public the condition of their industry. Declaring that the normal state of their industry for some years had been such as to 'endanger lives of the miners, waste the coal reserves, and deprive the operators of any hope of profit; that, subject to inter-state laws governing combinations respecting prices and distribution and to state laws governing the mining, fastened between combinations of buyers on the one side and labor unions on the other, they, the operators, found themselves unable to prevent waste or to enjoy sufficient profit, if at times they could make any profit, to properly equip their properties for the protection of their miners.' Asking that special attention be given the needs of the coal industry in the appointment of the then newly authorized Federal Trade Commission, these operators said, 'There is no desire now or hereafter to establish a coal monopoly. Much less is there a desire to extort unreasonable profits.' They invited 'appropriate and definite governmental control' to the extent 'at least of permitting all of their activities to be known to the public.' 'Coal operators would not object, but, on the contrary, would invite such publicity and supervision.'

"How desperate these operators considered their condition in 1914 is evidenced by these published statements. Had not the conditions surrounding their markets been violently changed by the war, they would have indeed been in desperate straits by this time. Now, the fundamental conditions have not changed



from prewar times. Coal operators are no more permitted now to combine in setting prices or in controlling distribution than they were six years ago. They are today confronted by the same labor unions and the same combinations of large steam coal buyers. They are today picking up the threads of the story where they left off six years ago."<sup>1</sup>

### *The Grievance of the Public*

The public never realizes the extent of its interest in coal mining, since more coal is used indirectly than directly. The great majority of people use but very little coal themselves and rarely know the difference between the kinds of coal; between anthracite and bituminous and lignite. And yet coal is the basic industry of modern life. And bituminous coal the most valuable of all. Without coal we could not get iron from iron ore in the quantities which we do; without coal we could not refine iron to steel; out of steel with the help of coal, machines are made, which make other machines, which may make cloth, and from cloth with the help of steel machines driven by coal power, clothing is made. Each step in manufacturing pays a tribute to coal. In addition, at each step, coal is used in transportation of the manufactured article from one point to another. The railroads are the greatest consumers of coal.

In 1825 there were mined in this country 117,988 tons of coal; in 1917, 651,402,374.<sup>2</sup> Modern life has developed through the use of coal and relative civilizations can be measured by its consumption. It could not have been done with wood. For wood will not make coke and coke is necessary in making iron. Moreover one pound of coal has a heat value equal to two and one quarter pounds of dry wood and, for equal bulk, coal, being heavier, has more heat units and so can be carried more easily to places where it is to be used.

The public, as consumers, should be vitally interested in any unnecessary cost of coal. In the price of every article there is an element of cost which can be ascribed to coal. If the cost of coal is one unit too much, then coke becomes, say, 1.10 too

<sup>1</sup> Introductory Survey of the Bituminous Coal Industry. C. E. Lusher. American Economic Review. March, 1921. p. 52.

<sup>2</sup> United States Geological Survey. C. E. Lusher. Coal in 1918. p. 710.

much, and iron 1.21 too much and steel 1.331 too much and the first machine 1.463 and the second 1.61. And so it mounts up, adding in at each step the cost of transportation and the cost of power, until the final excess unnecessary cost may be two or three times the first avoidable cost of producing the coal.

The public also has an interest that justice should be done to the workers in the mines. It has sought to remedy its grievance in this latter case, in mine laws enacted in each state "to provide for the health and safety of persons employed in and about coal mines."<sup>1</sup> So far these laws have been only concerned with the safety of the workers. The public through laws has ordered nothing as regards the organization of the work as a whole. Minor details, such as prescribing the manner of weighing the coal mined by individual miners, have been written into law. But the whole organic structure of the work, the interrelations of its various departments and the matter of its poor functioning producing injustice to the workers—that the public has left alone.

To assure safety,—merely protection of life—the public has employed state mine inspectors, whose duties have been to "enter, inspect and examine any coal mine and the works and machinery belonging thereto" and "make a report of the condition of the mine" and recommendations, having the force of orders, because "in case of his (owner's) refusal or failure to comply with the inspector's instructions without unnecessary delay, the Deputy Inspector of Coal Mines shall have full power to order the mine . . . cleared of all persons other than those he deems actually necessary and competent to remove or care for the dangerous condition."<sup>2</sup>

The mine inspectors have no power to examine the organization of the work of a mine in order to determine if the worker, protected as to his life, has as well the opportunity of earning money to support that life. That power has not been delegated to mine inspectors by the public. Instead the opportunity of earning has been left to a struggle between employers and employees and the public remains uninformed by any published

<sup>1</sup> Coal Mining Laws, Colorado. Issued by authority State Coal Mine Inspector. Eammes Bros. Denver. 1919. Sec. 39. p. 19.

<sup>2</sup> Ibid

annual report of any chief inspector of mines or tri-monthly report of any deputy inspectors.

There is a combination of factors entering into the operation of individual mines and of all mines. These factors impress a certain character upon the work underground. The miners have, at times, made protest against these resulting conditions and in their strikes have used force, more readily perhaps than other workers. These men, accustomed to using their muscles to accomplish their work, fall back on their muscles when it comes to getting what they want. The public, when called upon to maintain the peace, needs to know the characteristics of coal mining and the troubles which do not come to the surface even in times of disagreement but which lie back in the mines unrealized by either disputant.

## CHAPTER II

# COAL MINING

A nice old lady who lived in a big brick house right over a mine one afternoon asked: "Do you wear a lamp on your cap as an ordinary miner does?"

"Yes."

It was a foolish question. Everyone carries a lamp underground.

"I wondered," she said, "as I heard the mines were lighted by electricity."

"Just at the foot of a shaft," I told her, "and perhaps at a few switches further inside. There are a good many miles of workings, you know."

And then to me, who was spending almost an hour a day in the bath room getting clean, "I think you are mistaken, as Mrs. So and So said that the mines are lighted."

People who live on top of mines and never go underground are as innocent of what goes on there as a far-distant person.

Therefore it is advisable to begin with a description of mining—to indicate what a coal mine is like—in order that the stranger may understand how troubles arise in underground work.

Bituminous coal mining will be particularly considered, because the bituminous output is approximately five times greater than that of anthracite and the number of men employed underground is correspondingly greater. Moreover, bituminous mining is simpler than anthracite as it does not present so great a variety of underground conditions. Then, too, *anthracite is mainly a domestic fuel. Bituminous is industrial.* Yet the organization of the underground work in its main features is essentially the same in both.

The thing which enters into mining, as into no other industry, is the handling of ground. There is a burrowing into the earth with the consequent necessity, in order to keep the mine open, of supporting the over-lying rock. This cannot be done by using any amount of timber. Timbering is used only to hold in place the immediate roof above a tunnel, so that falls of rock a ton or two in weight will not come down upon men working

underneath, nor close the opening. The weight to be supported in a mine five hundred feet deep is about forty tons per square foot and in order to carry this weight not all the coal can be mined, but "pillars" of coal have to be left in place. As the working places where the mass of the coal is mined, are known as "rooms" the general method of coal mining in this country is known as "room and pillar." There is also a method known as "long wall" where no pillars are left and all the coal is won as the mining advances. The passageways—the haulage ways—are made by mining a part of the rock above or below the seam of coal and building this into walls so that when the overlying strata bend down over the edge of the coal an opening still remains.

Those who are accustomed to work only on the surface and have seen only the action of ground such as sand, do not realize the strength of rock in its natural place and how much abuse it will stand. Sand runs easily and is the hardest material to handle in mining.

The crust of the earth is not uniform in texture. To the geologists there is an infinite variety of rocks. In the coal region the rock lies as the parts of a layer-cake—an enormous layer-cake—with relatively thin slices of cake between which coal is spread like an icing. Or again the coal exists as a couple of black blankets in a pile of many grey and brown blankets, which have not been laid out with absolute smoothness, but so that there are long gentle waves. Rarely does coal occur where the strata have been mussed up as much as a bed in the morning,—a condition characteristic of the anthracite fields of Pennsylvania; not of the bituminous fields of the country.

The thickness and number of seams of coal vary. The thickness of the rock varies between the seams of coal. There may be only one mineable seam over a large area, or there may be a dozen seams in six hundred or a thousand feet of depth. A seam of coal thirty inches in height is about the smallest which can be profitably worked. Much coal is mined from seams three and four feet thick. But the easiest height of coal to mine is six feet. Eight-foot seams are not rare, nor are seams of twelve feet. But seams twenty and above are rare though seams as thick as sixty feet are known.

Generally in any one region the thickness of a seam of coal



remains fairly constant. If it is four feet thick at one place, ten miles away it is likely to be four feet, maybe three and a half, or four and a half.

Seams outcrop on the surface of the earth along hillsides or in gullies. Then dipping into the earth as the bowl of a flat spoon, in level country, they may not come to the surface again for many miles—ten, fifteen, twenty. In eroded country gullies and valleys will cut down to them at shorter intervals.

The simplest way of opening a mine is to drive a water level "drift" into the coal in the outcrop. It is harder to sink a shaft through overlying rock, but that has to be done when the coal does not outcrop within the boundaries of a property. Technically, the "drift" is only that short distance which it is necessary to drive a tunnel in through the surface wash and poor coal until the good coal is reached. From the "foot" of a shaft, openings will radiate out into the seam of coal, yet leaving as much coal as possible (a "pillar of coal") for support.

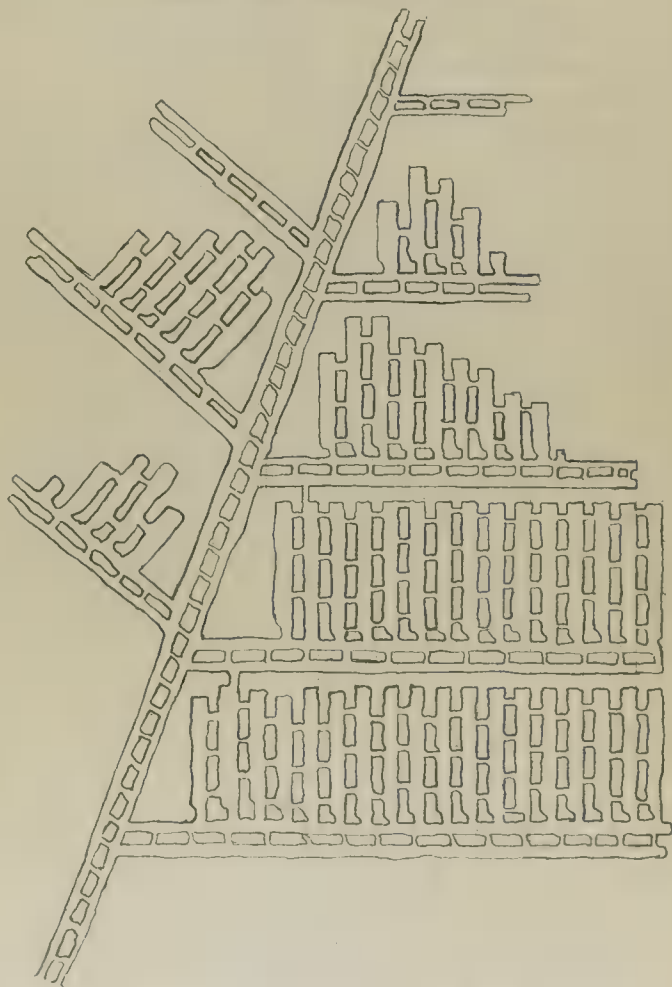
Beyond the drift the opening into the coal is known as a "heading," or an "entry," or, maybe, a "gangway." These are the names used for haulage ways in the mines. The "main entry" (heading) is a continuation of the drift and the point where the name changes from drift to entry is not exact but may be two or three hundred feet from the "mouth" of a drift. The drift and its continuing entry form the main haulage way out of which the coal will be brought in "trips" of a number of mine cars, each holding a ton and a half or two tons of coal.

Openings are never driven singly in coal mining. Two openings (or more for main entries) ten or twelve feet wide, and the height of a seam, are driven parallel to one another on about thirty to fifty-foot centers.<sup>1</sup> The purpose of this is ventilation. In order to control the current of air and get it to the essential places, as the openings are driven forward, "crosscuts" or "break-throughs" are driven from one heading to the other and as one crosscut is opened near the "face" of the opening, the next one behind is closed with a wall so that the air will travel up one entry to the face and back through the other. The distance between these break-throughs varies from forty to ninety feet according to the gassy condition of the mine and the distances

<sup>1</sup> Mine Law, Pennsylvania. Art. 6 Sec. 1 § 4.

prescribed in the mining laws of the different states. This driving of parallel openings and then parallel crosscuts leaves rectangular pillars of coal to support the roof.

Layout and opening of a mine



In the old days the skill of the miner was depended upon to keep these places going straight. Having got his course the real old timer would cut one side smooth with his pick and then he could sight along it to where his buddy held a lamp further along. Nowadays surveyors will hang two strings from pegs in the roof to give a sight along which to drive.

A favorite exaggerated story of the mines is of the Irishman who drove his place on such a curve that when he drove a crosscut, the place broke back into his own room. Looking through the small hole over the broken coal he saw his buddy loading a car and yelled at him: "Hey, Mike, get back into your own place."

After the main entries have been driven well into the solid, side entries are driven off similar to the main entries—double again, "entry" and "air course" or "heading" and "back-heading" according to the names used in the locality. These side entries are turned off the main entry about every four hundred feet. They will be driven twelve hundred or fifteen hundred feet long and will "block out" a rectangular "panel" of coal. The number of side entries may go up to fifteen—sixteen—even twenty-five in a small mine which has been worked for a number of years.

In mines laid out for large tonnages there may be driven second main entries off the main entry and the side entries blocking out the panels will be driven off the second main entries. In any coal mine the entries make a rectangular net work of haulage ways.

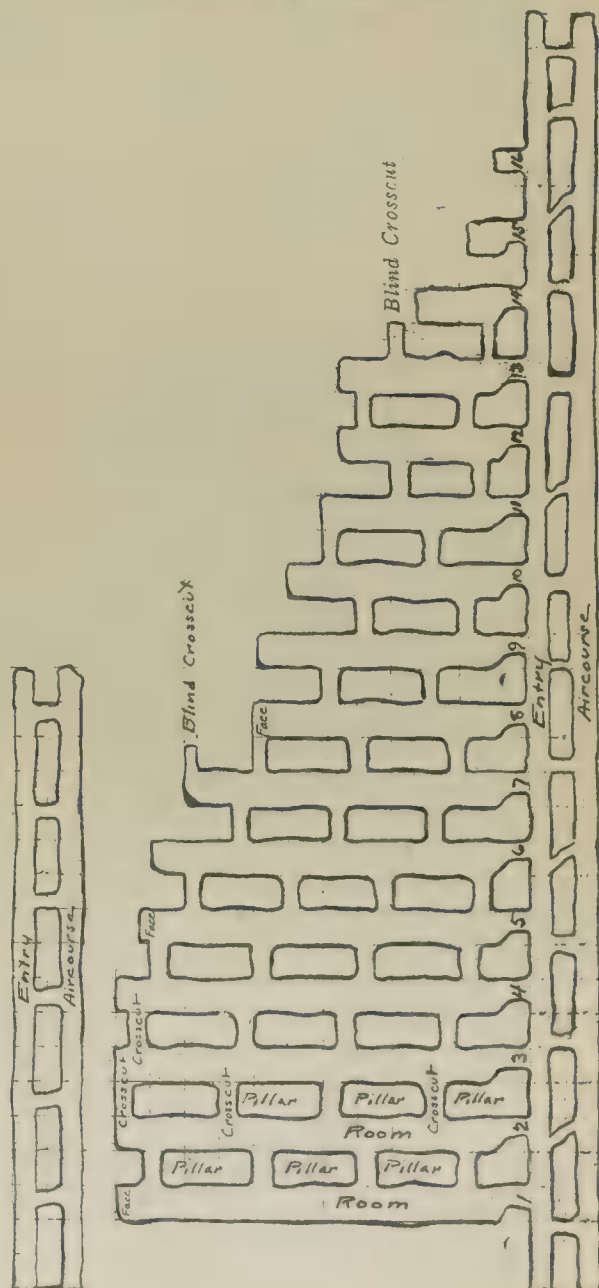
It is from the panels that the main output of coal is obtained. Off the side entries are driven the "rooms" and off a side entry twelve hundred feet long there may be a row of twenty rooms, again with "break-throughs" and rectangular pillars of coal between the different rooms so that the air goes to the face. It is at the face of the rooms that the majority of the men underground work; one or two men in each room.

The layout of a coal mine can be visualized if you will lay down a series of the halves of fern leaves alongside one another and connect them all at the stem end to represent a main haulage way leading in and out.

In order that the reader may understand the problems and slang of the mines, a diagram is given on the following page to show the layout and terminology of the work of a side entry and panel of coal. Miners speak of a panel such as this as an entry (or heading) as a whole and when they do so, they include in their meaning, the back heading and the rooms which are turned off the entry. In this drawing the first four rooms are shown as finished; that is they have been driven up far enough and stopped at a point where a pillar of coal will be left

## FOUR HOUR DAY IN COAL

Sketch of a Working Panel



between them and the back heading which serves the panel above. In drawing maps the engineers represent the pillars of coal which are left to support the roof by means of rectangles and as the sides of the pillar are rarely exactly straight, they are drawn in free-hand and not with a straight edge.

The rooms<sup>1</sup> are the places where the miners work and are numbered in sequence from the outside. In this diagram the first room where miners would be working is the fifth.

Between each two rooms there are break-throughs, or crosscuts, passage ways which have been driven to break through the pillars and so give a short (or cross) cut to the next room. Track is laid on the entry and in the rooms, a switch turning off the entry into each room. When the seam of coal is low—around three or four feet high—bottom rock may be taken up to give height for passage of the mine cars and haulage motors. There is no track in the break-throughs and as waste rock is thrown into them and in front of them, they are often rough walking.

The miner in the outside room generally drives the break-through to the next inside room. He will drive it in far enough so that when the inside miner gets his room up to the crosscut, he will break into the end of it. As a crosscut stands before it has been broken into by driving up the next room, it is called a blind crosscut. One such is shown in the diagram off room 13 and room 7. The break-through next to the face is known as the face break-through. To specify any of the other crosscuts, one will speak of the first, second, or third crosscut.

As the rooms are narrow where turned off the entry, that portion next to the entry is known as a room neck. After the room neck has got far enough away from the entry so that there is a strong pillar left, the miner will widen out the room. In the diagram room 16 is shown as being necked and room 15 as being widened out after the room neck has been driven.

Along the side entries a switch will turn off the entry track every forty or fifty feet, leading into the rooms. At the face of the rooms the miners are working. It is there that one finally reaches the warmth of contact with the mass of the men

<sup>1</sup> The face of the room is the inside end of it. In the terminology of the mines a room which has been finished still has a face, but not a working face, that term being reserved for a room where mining is still going on.



and the glow of the lights which they carry. The rooms are not long, probably three hundred feet when they are finished. They are not all started at once. They are started in sequence so that they are all different lengths. The stranger going into an entry will ask anyone: What is the first room working? The answer may be sixth—or the tenth—meaning that the first five rooms have been finished and no men are working there. So the newcomer will go up to the “face” of the sixth room to begin his visit to the men and make the rounds through the rooms off the entry by working back through the break-throughs between the rooms, not coming all the way back to the entry to go to the next room but taking the short cut over the gob and through the crosscuts (where there is no track),—perhaps a distance of 150 feet between two pairs of men. The driver hauling cars with his mule has to follow the track and go back to the entry and the distance for him is longer. Each room is shorter than the preceding one; less advanced into the coal. And so walking across the faces and through the crosscuts one works back until one finds a room just turning off the entry itself—the “inside room.” Then one has the face of the entry and air course to visit before one has seen all the working places off an entry as a whole and all the men at work in that panel.

In the diagram given there are shown twelve rooms working and the entry and air course; enough places for fourteen or twenty-eight men,—according as to whether the rooms are single or double. It is the arrangement of the work in these entries and rooms which is vital to the miners because on this depends their opportunity to earn. There must be enough transportation to provide them with cars. There must be enough machines to mine the coal. The miners must be regular enough in their work so that the faces of the rooms will lie along diagonal lines and one room does not get behind another.

Nine out of ten men employed at a bituminous coal mine work underground and the majority of the nine work in an area at the inside end of a mine. If the entrance to the mine is a drift, then one can light one's lamp on the surface and walk directly from the sunlight into the openings and the darkness under a hill. If it is a shaft, then one waits at the landing for a “cage” and, stepping on it, is “rapped away” down into the

darkness of the mine, to step off at the bottom and, lamp on hat, go about one's duties.

With a drift, one standing on the outside will see, every twenty minutes or half hour, a trip of loaded mine cars pulled by a motor, coming out from the drift opening bringing out coal. In five or ten minutes, the motor with its two men will have dropped the loaded trip and be departing again into the mine with a rattling trip of empties.

Those accustomed to life on the surface never think of ducking their heads when they walk into a building, but inside of mines one has not only to watch one's footing, but one has to keep a sharp look out overhead as well, to see that one does not try to put one's head in a place already occupied by a rock or a piece of timber. One's back, too, gets tired from bending over and the temptation after a bit of walking is to try to stand up straight, with a consequent frequent bumping of one's head. Old timers in the mines will bend down as they walk into a drift passing from the daylight outside to the dark of the mines. It is amusing to see them on a particularly sunny day when the contrast between light and dark is extreme, duck way over so as to clear the drift-timbers by a foot or two. On coming back out of the mine with their eyes accustomed to the dark, they will walk along, ducking their heads only just enough to graze the roof.

Walking into a mine one will not immediately find men working. Instead, one is more than likely to have to walk a mile or more before reaching a switch where the mine track divides off to the different working sections. On the way one may pass a man working alone "cleaning roads," cleaning up the coal fallen off outgoing cars, so as to keep a good footing on the narrow path running along side of the track. Or one may encounter a tracklayer and his helper. Walking along one follows the mine track through the openings or travels a definite route along a "man way" out of danger of passing cars. In any case on the right and left will be "old works" where the mining was done in the years before.

Old works are dangerous—because of the possibility of accumulated gas and because one has to pass under "bad roof"—loose, hanging rock, and because where they extend over a

large area, men often get lost in them, for many of the guide marks of live works are gone.

After one has passed the first switch, other branches will come more frequently and in the area of live mining, the branches leading off the main entry into side entries will come every four or five hundred feet. Near the beginning to the side entries one will find "passing branches"—a couple of hundred feet of double track, where the main road motor drops its trip of empty cars and picks up a trip of loads. To this passing branch men come and go. Two or three gathering motors may each bring a trip of six or eight loaded cars and take as many empties away. Driver boys with their mules may bring two or three cars and take empties away. Five, ten, fifteen minutes may pass without any one being on the passing branch. Then in a rush a number will come.

The distance from the main passing branch into the side entries where the miners are working may be a thousand feet or half a mile or more. As one gets into the side entries one finds more men—a driver and mule and a single car—a track-layer and helper laying a switch—a mason building a wall in a break-through, and every place in "live works" one finds track. Finally one reaches a section where there are a number of rooms in which coal is being mined and men are at work. In passing from section to section one is likely to travel along short routes through old works. In only the smallest of mines will there be only one section working. It is these sections which feed the loaded mine cars out to the main passing branch where the main road motors pick up the coal to be taken out of the mine and dumped into the railroad cars.

The work which is carried on underground can be divided into two broad classifications, that of mining and that of service. In the technical language of the mines, those men who loosen the coal from its place in the solid and then clean it and load it into the mine cars for transportation to the surface, are known as miners. They are the craftsmen of the mines. The men who work upon transportation and pumping and ventilation are known as company men. They are the men who are engaged upon service.

The miners comprise two-thirds to three-quarters of the men who work underground. They are the ones who drive the

main entries, the side entries and the rooms and the break-throughs, all the work which produces coal. In detail their work is to drill the holes for blasting and, in case a shot-firer is not employed, to fire the blast which loosens the coal. In case the mining is "pick mining" they may have to lie down on their sides and with a three pound pick, dig away a "V" four feet deep, at the bottom of the seam so that when a small blast is put in at the sides of the working place, the coal will fall down, breaking into big lumps. Technically this making a cut either at the bottom or top or side of the seam is known as the mining. In "blasting off the solid" there is no undermining and the coal is loosened by the action of the powder exploding in a hole in the coal. This method breaks the coal into smaller pieces and scatters it more, whereas with blasting after undermining, the coal lies in a shattered lump close to the unmined coal. Lump coal is wanted because that is the most valuable in the market.

In addition to the mining, the miner cleans the coal, taking out rock and "boney," and then shovels the loosened coal into the mine cars; stands timber to keep his place safe; takes down pieces of rock when necessary for safety, and lays the track for the mine cars. If the seam is low, he may blast up bottom rock or take down top rock in order to make height for the mine cars.

The miner is paid mainly by the ton of coal which he loads into the mine car. The coal is weighed after the car has been taken out of the mine and the miner having hung a numbered check onto the car, the coal is credited to that number. The custom of paying for any other work besides mining varies. Hardly ever does a miner get pay for standing props to hold the roof. He may get pay for other kinds of timbering—for "cross-bars"—when they are over a certain size. The laying of track is included in the price of coal. He may or may not get pay when he takes down rock in his place. He may or may not get pay when the coal gets dirty or pinches through some fault in the rock. In any case the rate of pay for other work is never as high as for mining, which is the main body of the work.

Part of the work of a miner has been taken away from him in slightly over half of the mining of coal. It is the work of undercutting the coal; that work which is technically known as "mining." Machines have been developed to do this undercutting

and where machines are used, two men will do the undercutting for a dozen miners, who then are called loaders after machines or machine miners. There is a looseness in the use of the latter term for at some places the term machine miners is used to indicate machine runners. The loaders after machines clean the coal and load it into the mine cars. By the machines part of the craft has been taken away from coal mining, and there are men—"foreigners" mostly—who do not know how to "mine" coal by hand. But generally a man is expected to be able to do "pick mining" and in any case the manner of pay is the same, namely, piece work. The machine runners may be tonnage workers or paid by the day. The essential thing is that the miner is a piece worker.

The "company men" are, on the other hand, paid by the day. They are the men who do the work of service for the miner and can be divided into two groups. The largest group is employed upon transportation. They are the motormen and the brakemen and the mule drivers. They deliver the empty cars to the miners and take the loaded cars away.

The smaller group of company men are the men who keep the mine in condition. They comprise the pumpmen who keep the mine free from water; the masons and bratticemen who maintain the air course; the road cleaners who gather up the coal which falls off the car and makes a road dirty and dangerous; and the timbermen and men employed on the odd things which must be done. This group like the other group of company men, are paid by the day.

As the majority of the men underground are miners, most of the men have definite places for work, for to each miner is assigned a working place which is customarily regarded almost as a personal possession. If a stranger comes walking through a mine alone some miner is sure to ask him, carrying out a standard joke of the mines, "You want place, me got good place, me sell you this place, lottsa cars, lottsa coal, ugh, ugh, fine place." "How much do you want?" "Feefty dollars." This is because a man will almost always have some coal ready for loading into a mine car, upon which he has worked and if anyone else was sent in to work in that place he would load out that coal and get pay for something, at least in part, for which he had done no work. The mining is not paid for until the coal reaches the surface. Among the company men the pumpers have



a very definite location for their work. The transportation men have certain roads along which they work and one can find them within the limits of a few thousand feet. The men on maintenance, however, travel all over the mine in doing their work and are here one day and there the next.

The underground work of mining is simple. There is no manipulation of material comparable to what occurs in a factory where many hands work upon a single piece of material to make a finished product. Consequently there is very little interdependence of divisions of labor.

All the work of mining is done in absolute darkness. Coal mining is different even from gold mining where the light from a candle will be reflected back by the white sparkling quartz and the grey wall rock. In coal mining the light from a lamp is absorbed in the black soot and dust which covers everything. No night on the surface of the earth has the darkness of a mine. At night on the surface one can guide oneself by the outline of buildings and trees seen against the sky. In a mine the darkness is absolute. There one learns to recognize objects more by the shadows which they cast than by their form.

As the life of the mines is always carried out in darkness ghost stories are common. One of the best is of a group of miners gathered in a crosscut sitting on their tool and powder boxes, talking. One of the miners told a ghost story. And then another beat him with a better story and so it went until in a short while they were all worked up over ghosts. One of the men was Davey, noted for his practical jokes. He sat at the end of the crosscut and quietly slipped out and around the corner of the pillar up the chamber into the darkness. There he took off all his clothes except his shoes so that he could walk around without the broken coal cutting his feet. First he walked by the end of the crosscut and never made a sound. The talking stopped. Then letting out a little moan Davey went by again and one man said, "Man, did you see that?" Turning around Davey let out a good groan and went by the crosscut but there was no one there.

There are dangers in mining but the man in the mines does not worry his head over them. They are a part of his work and to be accepted without complaint. Only where the natural dangers are added to by human carelessness, does he complain.

The men working in a mine are scattered just as mines as a

whole are scattered on the surface of the earth. Many men cannot work at the face of a tunnel, generally not more than two. So in order to have many men at work, many tunnels have to be provided.

The first thing which has to be thoroughly shaken into the minds of those who are accustomed to factory work and unacquainted with mining, is that in mining you never can see all of the men at one time. Instead, you only see one or two or maybe three men at once. The rest are scattered in separate rooms through the mine. A mine foreman remarked recently that he always knew that trouble was brewing when he found four or five men talking together and beating it away when he came in sight; to see four or five men at one time is rare enough to arouse suspicion.

The working places are scattered on the outside edge of an irregular circle, all the interior area of which has been mined over and become "old works" and through which pass the main roads which are the traveling ways and the haulage ways along which the mine cars are taken in and out of the mine.

The character of the work of a coal mine is crude. It is mostly pick and shovel work. There is no working to the thousandths of an inch as there may be in making a machine. There is hardly working to the foot. For instance, the law in Pennsylvania only requires in the making of mine maps a scale of 100 feet to the inch, and in Illinois it is only 200 feet to the inch.

No work is ever done in exactly the same place or in exactly the same way. The work is always slowly advancing, working away from a center with distances getting greater and greater. The place where yesterday coal was mined and taken out, exists as an opening to get at more coal today. A miner does not have a repetitive job comparable to a man tending a machine. It is repetitive in that it is the same sort of work, but it is always in a slightly different place.

Large tonnages are handled in coal mining. An output of five hundred tons a day is small. An output of one thousand tons or two thousand tons is common. The largest mines put out five thousand and six thousand tons in eight hours. The individual work of many has to be combined to get a total output.

A mine grows. It is distinctly a thing of growth. From the beginning in building a factory many men can be employed. It is only a matter of a few months for erecting a factory building and installing the machinery before full output is obtained. It is a matter of a few years before a large mine can be brought up to capacity.

It is a matter of months to sink a shaft and then from the foot of the shaft the entries have to be driven away into the coal. Even starting on an outcrop, entries can only be advanced at a rate of between one hundred and two hundred feet a month. Two or four openings may be started from the surface and only six or a dozen men employed in the beginning. At the end of two or three months there may be room to employ another six or a dozen. At the end of another couple of months, another six or a dozen can be employed. A mile of entries is likely to be driven before any rooms are turned—any real production begins.

There is another radical difference between mining and manufacturing. A factory can be torn down and rebuilt. *A mine cannot be made over.* When the openings have once been made they are fixed. Coal which has once been taken away cannot be replaced by any artificial support.



### CHAPTER III

## THE MINE FOREMAN AND HIS PROBLEM

The supervisory force of a mine consists of the fire boss (or mine examiner), the assistant foreman, the foreman (in Illinois called the mine manager), the superintendent, and the customary officials of a company.

The fire boss examines a district in the mine before the men go to work to see that there is no accumulation of gas and that the working places are safe. He goes on duty about 3:00 or 4:00 a.m. and goes off duty before noon. As he oversees a certain section of the mine during the first hours of work, he occupies the position of a second assistant mine foreman and is required to have a state certificate. He is paid by the month or day.

The assistant mine foreman is what his title implies and generally possesses a state certificate of competency.

The mine foreman is the keystone of the organization of the work in a coal mine. His work has a dual character. He is licensed by law to hold the position of foreman and has certain duties required by law. In that respect he is an officer of the law. He draws his pay, however, from the mining company, as he does his authority to be in charge of a certain mine. He has a financial responsibility to the company and it is his duty to organize the work of a mine. He has oversight over all the details of the underground work, the assignment of the miners to their working places, the assignment of company men to their job. Generally he has the hiring and firing of the men, and the determination of how many men shall be employed. He has the planning of the daily work and the follow up to see that it is done.

The mine foreman has more responsibility than his title implies. He is in charge of all the underground work. Organization of this supervision is as simple as can be imagined. The foreman does it all. No chart is needed. The foreman is responsible. In cases where there are a hundred men employed,



he may have an assistant. A foreman in charge of five hundred men may have two assistants. A wise foreman gives his assistants authority, but often one finds assistants without needed authority. There may be machine bosses or fire bosses or examiners under a mine foreman but the amount of their authority is generally small.

The law of Pennsylvania requires that "In all mines the mine foreman shall employ a sufficient number of assistants to insure a visit to each working place, either by himself or his assistants once each day while employees are at work."<sup>1</sup> The law of Illinois reads, "It shall be the duty of the mine manager: 1. To visit each working place in the mine at least once in two weeks."<sup>2</sup> Consider the customary supervision when such things have to be ordered by law. It is ordered for safety of the men, not to affect the organization of the work. Coal mining is surrounded by laws. The dangers encountered have forced their passage. The follow-up on the causes of accidents through the departments of mine inspection have from year to year added to the detailed regulations prescribed by law. Compensation insurance and the standards prescribed under compulsory insurance have also added to the details required in underground management. There is no quarrel with these laws, but the mass of details is growing so large that they have become a study in themselves.

The pay of a mine foreman is low. At almost any mine when it is running steadily one can find miners who are earning more than the foreman. But mines never run steadily throughout a year and as the foreman's pay continues through idle times, his yearly earnings are above that of a workman's. A few years ago a foreman would be paid \$125 a month. Nowadays a foreman will receive about \$200. In 1915 the highest paid foreman in the anthracite region of Pennsylvania received \$165 a month. One can take it that his pay will approximate a dollar an hour on an eight hour schedule the year round.

Most bituminous coal mines work only a little better than two hundred days in a year and it has been a matter of keeping down overhead and idle day expense, to have as few bosses as possible

<sup>1</sup> Commission of Pennsylvania. Bituminous Mine Law. 1919.

<sup>2</sup> Illinois Department of Mines and Minerals. General Information and Laws, effective July 1, 1919. sec. 20. p. 61.

at a mine and to have their pay low. The small number of bosses and the small pay which they get create one of the crucial things in coal mining.

The laws of the states in general require that a mine foreman shall have a certificate of competency. The 1919 law of Pennsylvania has been amended so that it now reads, "The mine foreman must possess a mine foreman's certificate, or be a person who, in the judgment of the operator, is a person equally competent with the holders of such certificates."<sup>1</sup> As a practical matter the examinations for certificates are not so difficult but what a man competent to fill the position of mine foreman should be able to pass them. The limiting factor in getting a certificate is the requirement of the law that the applicant shall be a "*practical*" man and shall have spent a number of years in the mines.

Examinations for mine foremen's certificates cannot be very difficult when the daily report book of a mine reveals over the mine foreman's signature, "all places working excipte Strate Hedin wich is drowned out." Such illiteracy is common. In a class for study in order to take the mine foremen's examinations, it was found that 90 per cent of the men had only got as far as the third, fourth, and fifth grades in school, and only a couple had had a year or two of high school. Opportunity for education is even yet too small in coal mining. Moreover the law almost rewards those who have left school early.

The law of Pennsylvania reads—it is nearly the same in other states—"Article IV Section I. In order to secure efficient management and proper ventilation of the mines, to promote the health and safety of the men employed therein, and to protect and preserve the property connected therewith, the operator or superintendent shall employ a competent and practical mine foreman for every mine where ten or more men are employed. The mine foreman shall have full charge of all the inside workings and of the persons employed therein."

Notice that the first purpose of the law is to "secure efficient management." Then going over the rest of the law one may notice that all the subsequent provisions apply to safety. And notice that the mine foreman shall be one "competent" to secure

<sup>1</sup> Commonwealth of Pennsylvania. Bituminous Mine Law. 1911. Art. XXIV. Sec. 4. p. 112.

efficient management. The law does not state how efficient management shall be measured. One may logically ask the question: Is it efficient management when only safety of life is secured or does management also involve the coordination of divisions of labor *so that a workman, possessing life, can maintain it as well through working and earning?*

In considering mining one must never forget the isolation and the hard living conditions, things which are not likely to attract men to it. The law and the pay and the work and the living are all such as tend to keep away any educated man from the position of mine foreman. And the responsibility is large. Most foremen and mine superintendents have come up from the bottom and many an old timer will boast about having started in the mines when he was eight years of age. Such things are no disparagement of the character of mine foremen and superintendents. But the training of any man in charge of men, affects those entrusted to his care.

Practical training in mining—of actually having done the work of swinging a pick or standing a prop or laying a switch—teaches how to do those individual things. It does not teach how to add together the work of loaders and machine miners and drivers and motormen and trackmen—the work of all the men in a mine. And the essential thing of a mine foreman's job—more even than of a superintendent's—is that of adding and balancing the work of men—coordination. As in other lines of work, there is a failure to appreciate the fact that the foreman's job has changed from the swinging of the miner's pick and shovel to a pencil and paper job.

Few records are kept around a mine. In conducting the work a mine foreman relies upon his memory. He keeps a time-book of the hours worked by the company men, but no record of what work they do. For the miners, it is rarely that any attendance record is kept, and then it will only indicate whether they reported for work, not how many hours they worked. The weigh sheets and the pay-rolls are the two main records kept at a mine. Out of them one can with much effort dig information concerning the coordination of the work. They contain no more than is necessary to make up the pay-roll—a bare minimum.

The two most frequent words one will hear around a mine,

are "I guess" and "about." Ask any foreman a question such as, "how many miners have you working here?" and the answer will be prefaced by "about."

In many mines the miners—the piece workers whose hourly record is not necessary for payment—do not report for work in the morning nor when they go home during the day. In such cases the only way to know who is at work is to go through the working places checking them up. And then during the hours of tramping necessary to do this, some men are more than likely to have gone home before being reached.

As an incident to safety regulations the laws of Illinois and Colorado prescribe that men must be checked in and out of a mine. The law of Illinois<sup>1</sup> reads that it is the duty of the mine manager "to provide a suitable checking system whereby the entrance into and departure from the mine of each employee shall be indicated." This checking system has no bearing upon the organization or control of work and the law does not prescribe that any record of attendance shall be made upon which a judgment concerning any workman can be based. After the day is over the slate is wiped clean for the morrow. Only somebody's memory of the day's performance remains. The checking is done only for one day and that with a view solely to an accounting of the men in case an accident should occur.

The distances which a mine foreman must walk are large. His problems are scattered unevenly, and each is separated from the next by a walk. Five miles will be a short day's tramp for him. A foreman who has visited only thirty places in the four hours of the morning will consider he has done an easy day's work. Four hours—two hundred and forty minutes, thirty places—eight minutes to a place including the time coming and going. In some places he will walk in and walk out spending only a minute. In others he will have to wait a few minutes, five or ten, while a miner stands a prop. In other places he may have to boss the job of pulling down some bad roof. Minutes slip away quickly. Not only must working places be visited but the foreman must see if the switch, which he ordered laid the day before, was laid so that the miners in some room can work, or if the frog, which he ordered to be changed on the main road,

<sup>1</sup> Illinois Department of Mines and Minerals; General Information and Laws, effective July 1919. sec. 20. par. 2, p. 61.

was changed. There are as many items to check as working places to visit. In between he has to hustle, to foot it fast. There is no time to stop and watch how things are going, no time to stop and teach a poor workman. He is pushed for time. He must hurry. He cannot stop and measure up things. He must get things done. He must drive.

After a mine foreman has started upon his rounds he is almost lost to the men however much they may need his instructions concerning their work. A workman wanting the foreman will wander from room to room and along the gangways asking whom he meets, "Have you seen the boss?" Finally he will find someone who will answer, "I saw him going into 16 Right a half hour ago." So guessing the direction of the foreman's rounds, the workman will make for 17 Right and ask if the boss has been through there. If he gets hot on the trail all right; if not, he will make for another entry leaving word as to what the trouble is. It may be an hour or two before he finds the boss. Perhaps he will have traveled a mile or two.

I can tell a tale out of my own experience to show how unfindable a man can be in the mines. Years ago one morning the head footman stuck his head in at the door of the foreman's shanty and remarked "Old Eben's white horse was seen coming over the hill." Old Eben was the big boss, the superintendent. With one accord we all reached for our lamps and started off into the mines. For myself I left word that I would make an inspection of return air ways. It is a duty required of mine foremen once a week by law. No men work along return air ways and one is lost until one comes out again. Having left word where I would be I went through the door into a return opposite the shanty and was gone. As a matter of fact I went a few hundred feet, crawled into an old crosscut where ashes had been washed down into the mines, dug a hole for my shoulders and my hips and went to sleep. There had been a party the night before and I was a bit tired. Some time after noon I came out to find that old Eben had been fuming around for four hours, sending in word by every motorman who brought out a loaded trip of cars and went back in with empties. "You tell him I want to see him." But then at noon time, getting hungry along with the rest of them, he had gone home and we all were safe for a couple of months until time for another visit.



So it is easier, if anything goes wrong in his place to prevent a miner from working, to sit down and wait and trust to luck that the boss will come that way. After two or three hours of waiting, doing nothing, in the damp cold of a mine, the workman will take his dinner bucket and go home. He has no assurance that the boss will come his way that day. And there is no one else to straighten out his troubles. He knows his best chance of seeing the boss is at noontime or on the next morning when he can find him outside. He won't wait many times before he will turn around and walk out as soon as he finds trouble in his working place.

And the boss—the foreman—after walking four hours through a mine, he is tired; he has done a day's work. At noontime he comes out of the mine to get his lunch and to get in touch with the center of things again, so that men who want to find him can. If he has walked any distance (made any rounds) in the morning, there is not much "pep" left in him for the afternoon. He takes it easy and then sees to the pumps and the fan and the things which do not require much walking.

One has to be right on top of work before one can see it underground. The lamp which one carries lights up only a few feet. As an example of how short a distance one can see in the mines, I would tell of the question I asked a mine foreman one noon. We were walking out along a main road and passed a track cleaner and walked over the work he had been doing. The road was rail-high, dirty with loose coal which had fallen off the mine cars. It was easy shoveling and the job was to gather up the coal between the rails (30 inches apart) and three feet on the outside of each rail. As we had passed over what had been cleaned, I paced off the distance. I had noticed that track cleaner earlier in the morning; had idled around and watched him for an hour or so and passed that way a couple of times. So when he got by, I asked the foreman if the man had done a morning's work. He stopped and looked and "guessed" he had "all right." We could see only one end of the work, not the full fifty-five feet, which merged into the blackness of everything around. As a matter of fact that man could have cleaned one hundred and twenty-five feet in an hour. He had cleaned five in five hours.

Why the foreman passed it is easy to explain. It was almost noon and he had to be out of the mine at twelve to take the

time of the men from the petty bosses and arrange for work with them. He was hustling. But it is hustle that way all the time. The law gives the only detailed instructions he has to guide him in his work. The law, and the emphasis of others on that point of the law that he shall visit the working places each day, makes him hustle from place to place until merely visiting and snatching at details becomes a fixed habit at the expense of organizing and directing the work as a whole.

Part of the time—in some mines most of the time and in others all of the time—a man cannot stand up straight while walking but must bend over, which makes the fatigue of walking underground greater than on the surface. The footing underneath is rough. It is broken coal and rock, not smooth earth. That, too, adds to fatigue. When it is necessary to travel with a safety lamp, giving only a fraction of a candle power of light, that again adds to fatigue.

If a foreman sends for a certain workman to do a bit of work, it is likely he will have to wait from a half hour to an hour before the man can get to him. Ten minutes would be a short time. If he goes after the man himself, he is likely to have a walk of twenty or twenty-five minutes. One cannot chase up many men in a day. So the work is put off till the next day when the man can be reached as he comes to work in the morning.

When one wants to find a workman he can have vanished as easily as the mine boss. One summer day John and Tony and I decided that it would be a good thing that morning to scatter ourselves around the mine on the outside where we could see every approach to the shaft. There happened to be any number of holes through which you could duck into and out of the mine and we suspected that many a man was taking time off. It was pleasant weather outside. In winter one does not need to worry that men will leave the mine. We found that between nine and ten o'clock the head footman beat it away to Joe's saloon, a mile from the shaft. Between ten and eleven his assistant took a turn. The first person I caught was a fire boss who popped innocently up almost in front of me. Before noon we had caught any number of the company men. Miners of course are allowed by custom to go home at any time they choose. Investigating later we found that it was a regular practice for some of the men to be gone between the hours of nine

and eleven in the morning when we were usually on inspection at the inside end of the mine.

Telephones are used in mines but it is probable that no one will be at the other end. One may ring for half an hour without getting an answer. There is no fixed working place for any one in a mine, except for the miners at the working faces and these faces are continually moving, though slowly. All the company men, except pumpmen and engineers, have work which requires moving around. A systematic use of the telephone by certain persons at definite times could be arranged, but this is one of those things which just is not done.

With the impossibility of the mine foreman's thoroughly overseeing all work, dependence has to be put on the workmen somehow to find their own work and do it. In a small mine where many men do not have to tie in their work with many other men, this is a possibility. But where the number runs into the hundreds, it is not as possible. Moreover workmen are not expected to be trained in planning and executing. The result is that work underground is often mob work, not the work of trained troops.

The voice of the mine foreman has never been heard in the turmoil of industrial trouble. He is not likely to tell you much up in the daylight on the surface of the earth. But walk through the mines till you come to an empty room where everything is quiet and no one can overhear you and no one can come upon you, then he will tell you of his own troubles. He meets the brunt of getting out the coal and handling the men. He is doing the best he knows how. He needs help and he often feels forgotten.

In the army it is considered worth while to train a man how to command. In civil life it is not done. All the literature of mining concerns machinery and handling ground. None of it concerns the organization of work or regards the adaptation of mining methods to the human factor involved in the work.

#### *The Transportation Problem*

The problem of the mine foreman is to get out coal through the work of men. To do this a system of narrow gauge railroad must be maintained, which transports the coal from the various places underground where it is mined, to the surface and the railroad cars. This railroad system has many miles of track

and its operation involves a lot of switching and the coordination of many branch lines to the steady operation of a trunk line. Surface railroad systems are run on time schedules. Mining systems are just run. A mine foreman will rarely know the exact number of minutes which a trip should take between two points, nor is there any definite schedule of the number of minutes which should be allowed at the end of runs for a motor-man to drop one trip of mine cars and pick up another.

The handling of the individual cars in side entries is also run on guess work. No definite number of men are employed on a side entry proportioned to the distance and time involved in moving cars. It takes about one minute for a driver with a mule to take a car from the room-switch to the face of a room which has been driven in seventy-five feet, uncouple from the car and bring the mule back to the entry. If the room is in one hundred and fifty feet, then it would take the driver two minutes. But measuring up the time involved in any work is never done. A driver will be assigned to an entry and it is not often that the number of miners to whom it is his work to deliver empty cars and from whom he takes away loaded cars, will be proportioned so that the miners get cars on the time intervals which they should. Instead miners are put to work as there are working places available, with the result that no two drivers in a mine have equal amounts of work.

Moreover the main roads do not work with regularity so that a driver cannot count upon having a trip of empties delivered to him on the intervals he needs them. Nor can he count upon having his loaded cars, which he has gathered into a trip, pulled away. If a motor or driver handling trips of cars is delayed on any one branch, it means a consequent delay on all other branches.

On some roads a driver can distribute his empties and gather his loads from the rooms in less time than the motors can distribute and gather trips from empties, so that he will always have his trip of loaded cars waiting for the motor. On other entries the reverse will happen. The consequence is that a mine foreman, pushed to get out coal, will send the motor to that road where the coal is probably waiting, skipping the turn of the road where the motor might have to wait for a loaded trip, with the result that that road will get more cars in a day than the other entries. And the miners along that road will get more cars and, as their opportunity for earning is dependent upon the

supply of mine cars delivered to them, their earnings will be higher than miners working in other parts of the mine.

It is this situation which is known as a free or an unlimited turn and it is to correct this situation that the provision for equal turn has been written into union contracts.

The Hocking Valley district of Ohio is a basing district in the making of contracts between the United Mine Workers of America and the coal operators. Section four of the contract which went into effect there on April 1, 1920 is as follows:<sup>1</sup>

*"Turns"*

"Section 4. The operators shall keep a square turn, and it shall be the duty of the superintendent to see that this rule is properly carried out and that at least each two weeks the turn for all sections of the mine shall be made uniform.

"There shall be no free turns allowed to either rooms or entries. The entries shall be driven as fast as operators desire or conditions permit, but, in no case shall entry miners be allowed more cars per week than room miners. If however, the regular turn will not allow cars enough to drive the entries as fast as desired, the operators shall increase the number of miners in each entry, so that by giving to each the regular turn, the entries shall be driven as fast as two miners could drive them with full work. But should the room men decline to take their places in the entries when requested to do so by the operators, then the entry men shall have free turns until the entries are driven the required length. Nothing in the foregoing to prevent fast turns.

"This rule shall apply to the machine men as well as loaders and the company agrees to use every effort to the end that the number of men on each machine will be equalized."

This section of the agreement does not specify that any miner shall not load a full number of cars. It only specifies that each miner shall be given the same number, without putting any top limit to the amount of work the miners shall do.

The distances along one entry over which mine cars have to be moved are never the same from day to day. Rooms and entries are continually advancing—slowly to be sure—three, four, five feet a day—but still moving, so that the distances are appreciably different from week to week and month to month. So on one entry a driver during one month driving to a dozen men may

<sup>1</sup> United Mine Workers of America. Detailed Mining Scale for Hocking Valley, effective from April 1, 1920 to March 31, 1922.



have only eight-tenths of a day's work. During the next month he may have a full day's work and during the following month he may be called upon to attempt to do one and two-tenths days' work: a situation where there is too much work for one driver and not enough for two, and which is at the expense of the miners, who are paid by piece work. The driver is a day worker and gets paid whether he has a full days' work or not,—a place where the cost of production goes up.

The distances also change which are traveled in gathering the small trips from the side entries and combining them with trips from many entries to make a grand trip for main road—trunk line—haulage. But they change more slowly than entry distances because it takes a longer time to work out an entry than to finish the mining in a room.

Distinctly mining is a transportation problem underground: A problem of transportation with increasing distances and one whose terminal is always advancing. Only 15 per cent of the men under-ground are employed on transportation, but the manner in which their work is conducted affects the 75 per cent who are the miners and who get their pay from the coal loaded into mine cars.

If the mine is large enough a "driver boss" will be employed to oversee transportation. If there is no driver boss, then it is one more duty for the mine foreman who must follow up many things. No records are kept at mines to show how much work each unit of transportation is doing. Payrolls, the source of information at a mine, are kept according to the numbers of the miners and not according to the rotation of the miners in working places. The man with check number 320 may be working alongside number 53 and the next man may be 142. Moreover payrolls give only the weight of coal sent out by each miner; not the number of cars which were given to him.

No records are kept at a mine to give the mine foreman this information which he needs to keep the transportation coordinated and balanced. He must attempt this by guess work and judgment from impressions which he gathers as he hustles from point to point, or from protests when the men finally complain.

The stranger to mining might ask, why do they not decrease the number of men along a side entry so as to balance the increase in the distance as the places advance, and thereby keep the amount of work for the driver and mule or motor equal.

Balancing work would necessitate measuring work because unknown quantities cannot be balanced. Measuring work means pencil and paper work and the keeping of records. And those who have ever had work in charge, know that it is impossible for a foreman to stop and measure when he is overseeing work and is pushed to attend to detail after detail.

The trouble comes from requiring one man to do two things which require diametrically opposite conditions—engineering and supervision. Engineering requires that one have the opportunity to sit still in one place and watch and figure for days at a time if need be. The supervision of work requires that one should be constantly on the move, particularly in coal mining where work is so scattered. It becomes a practical impossibility then for the same man to do good engineering and supervision and as the latter must be done, the former is neglected.

Adding a man to do the engineering is a matter of cost. There are too many idle days during which his pay must go on, for a trained man cannot be laid off. The item of his pay would be a large charge against the production.

So this charge is avoided and the mine foreman is generally supposed to know the engineering details and where there is a waste. One will often meet the expression, "The mine foreman knows." But a little pencil and paper work will often tell a different story, that nobody knows.

Having a number of miners on any entry proportioned to the transportation on that entry, cannot be considered without considering the problem which the mine foreman has in managing the miners and directing the mining.

The layout of the mine is not done by the mine foreman. The lines along which the entries and rooms are to be driven, are laid out for the foreman by a surveyor, who prescribes width. If the roof is good, entries may be driven fifteen to thirty feet wide; rooms, thirty to thirty-six feet. If the roof is poor and will not stand up over a wide area, they are narrowed up. There is no consideration of the human element in working out the size of openings. Ground conditions (and machinery needs) only are considered.

During twenty years of reading coal mining literature, I have seen many discussions as to the proper width of rooms and the proper size of pillars. These discussions have always considered the weight to be supported and the character of the roof rock.

They have also considered the conditions to be arranged for the final extraction of the pillars, so that the maximum amount of coal can be obtained. Now in "pick mining," which is craft work requiring the same man to undercut and load the coal, the width of rooms has not the element of importance in the coordination of work as it has where one set of men do the undercutting by machine for a number of loaders. In this latter case, for coordination it is advisable that a definite unit of tonnage which can be loaded out within the unit of time of work should be undercut so that the men doing the undercutting can come back to undercut again at a definite time. In the engineering literature of coal mining thought on coordination of work is lacking. And the changes from the old craft work which the introduction of one machine has made, and the increased need of coordination are not yet taken into account in the laying out of underground work. If it is not in the literature, it is probably not in practice. The almost universal "room and pillar" method of mining is one which scatters men over a large area and makes the supervision and coordination of divisions of labor difficult.

Miners are always anxious to get a place along an entry where the seam of coal is free from bands of rock and "bony" so that they will not have to do much cleaning of the coal which they mine, for the biggest part of the cleaning of coal is done by the miners in the mine itself immediately after it has been mined from the solid. The dirt and the rock is thrown back and forms what is called "gob." Not only do miners want an easy mining place but they want a room on an entry where they can get plenty of cars. Both of these things mean greater earnings. They will take a place where the roof is bad and the danger consequently greater, if only they can have a chance to earn more.

A miner staying on one road day after day knows more about how the work on that road is going than a mine foreman visiting it for a half hour every now and then. He knows whether the driver is giving him cars and whether the driver is working. If he does not get cars, he is likely to be out of his place on the entry road chasing up the driver. It is well to stand in with that driver; to give him oil and let him eat what he wants out of your dinner bucket and be glad that your wife is a good cook so that he asks if you have any pie. For the driver can slip you an extra car or two when a trip happens to be sent in with a car more than there are men on the entry that day.

The miner knows too when the distances become too great for the driver and when there are too many men on the road,—knows it because he does not get cars. Many a foreman will grumble at a miner who comes to him asking to be given another place six weeks after being changed at his own request. The energetic among the miners are always wandering around watching where the best places are. A miner may appreciate sooner than a foreman that haulage conditions have changed for the worse along his entry and go seeking a better entry.

In going through a mine one day with a superintendent, as we passed from room to room the various miners complained, "What's the matter, Mr. John, me no get cars." The first man complained, the second, the third. It was not until we got to the fifth that one man said, "Mr. John, me no get cars. There are twelve men after this driver"; the superintendent replied, "Is that so? Too many for one driver and not enough for two?" "Yes," said the miner, "that so."

Transferring the miner from one entry to another may be the straw to break the back of well proportioned haulage along the second entry. And then the unphazed, energetic man will ask to be changed again, and be thoroughly cursed out by the foreman, who will complain to you about "them damned Italians, they are more bother than they are worth."

In visiting the working places, the distance between any pair of men is likely to be at least one hundred and fifty feet. In passing from one room to the next, a man will have to duck his head as he goes through the crosscut, perhaps crawl on his hands and knees, when the coal is low. Twenty-five feet of crosscut and then twenty feet over the gob to get out onto the roadway in the next room, where walking is possible. Then up the road to the face. At the end of the track is the mine car. The foreman will stop to examine the coal in the car, passing his light over it to see if the miner is loading clean coal. Beyond the car there is the roof to examine to see if the miner is safe. Picking up a pick or a drill, the foreman will "sound" the roof; good roof, when it is hit, gives off a solid ping, bad roof with loose rock gives off the "pung" of a bell.

When there is loose coal along the face, ready to be loaded there is a temptation for a miner to take a chance and load the coal rather than pull down a slab of loose rock above him. The foreman must watch out for that. If the miner pulls down the rock it will fall on the coal which is ready for loading and

he will have extra work afterward cleaning the rock out of it. If he does not, he may get hurt. So he often takes a chance on his life and will shovel away under dangerous roof. When all the coal is loaded and the bottom is clean, then he will pull it down. The coal is in the way, too, for standing a prop that would hold up the slab. He will get no pay for taking it down nor for cleaning his coal afterward. With the coal loaded he can attend to the roof more easily and not hurt his earnings, though he himself may get hurt in the meantime.

Almost two-thirds of the accidents in the coal mines occur at the working face. It is not the big mine explosions which account for the greatest number hurt in the mines. It is the ones and twos hurt at the working face who make up the totals. There is a continual drive needed on the part of the foreman to compel the men to keep their places safe; to stand timber, and to take down slabs of loose rock.

Having seen that the place is safe, the foreman must see that the mining is being properly done; that the room is the correct width and being driven straight, before he walks back to the "face crosscut" and goes through to the next place, to visit other miners and do the same thing again. A few of the places will always be in good condition; many will be in ordinary condition and require effort on the foreman's part; the places of some men are always in bad condition.

The tale is told of a North Welsh foreman that he had to fire one of his men for doing poor work. A north Welshman is a good miner but his English is often amusing. He may tell you a story of his wife and start it correctly with "she" but you will find a "he" creeping into the story to mystify you and you will be utterly bewildered when an "it" creeps in. The North Welshman went down into the mines into the place which was going as crooked as a dog's hind leg and said to the miner, "I don't want to get mad to you. Mind you, yes sir, I don't want to get mad to you, but take your tools to the hell."

At times when the mines are dusty and gassy, the blasting down of the coal is delegated to certain men called shot-firers, who do this work while the men are out of the mine. The reason for having shot-firers is that many dust explosions have occurred which were started by "windy" (or "blown out") shots; blasts which blew out the powder as from a cannon because the hole was too firmly laid, and the flame



from the powder ignited the coal dust which is everywhere in the mine, and the heat from the dust burning in the confinement of the mine caused an explosion, just as confined powder explodes, while unconfined burns. The employment of shot-firers makes another division of labor, whose work has to be coordinated with the rest.

### *Measuring Day*

Every two weeks "measuring day" comes around for the mine foreman. On that day he has to visit all the working places and measure up the work which the miners have done in order to credit them on the bi-monthly payrolls. In narrow work miners are paid for the number of yards driven. Cross-cuts, room necks, entries and back entries are so paid. The rates are fixed for this kind of work. The foreman measures up the distances and credits them in his yardage book which he turns over to the payroll clerk. Payments are also sometimes made for certain kinds of timbering and the timbers have to be counted. Payments are also made for cleaning up some falls of rock and for dirt and faults which are encountered in the seam of coal. The mine foreman uses his judgment in paying for these. He may be called upon to guess how much money a man should be paid for cleaning up a fall of rock although he never saw the fall and can only gauge his guess by looking at the place in the roof from which it came and after it has been covered with timbering. Allowances are also often made for meeting hard mining conditions. It is in meeting requests for pay for odds and ends for which there is no set rate, that the mine foreman is likely to get into trouble and be accused of showing favoritism toward some men. Those who have been mine foremen know that the requests for extra pay come regularly from certain beggars, but more particularly are the requests more numerous during those times when work is slack or in those parts of a mine where the cars are not "running good" and the earnings from coal are low.

So there is not only the problem of getting out coal through the work of men, but also of justly rewarding men for work done.

The mine foreman may have four divisions of labor to co-ordinate; transportation with its trunk lines and branch lines and individual switching; loading of coal into mine cars; blasting

of the coal; and mining the coal by machines. Two of these are piece work operations; loading and machine mining. If any one operation fails to do its work, the opportunity for the piece workers, the tonnage miners, to earn is decreased; they are losers. And so the foreman, who is responsible for the organization and coordination of work, as well as for detailed supervision, becomes the storm center of grievances.

## CHAPTER IV

### TIME FOR THE MINER

The heart of the discontent of the "miners" is in their earnings. They are piece workers and the quantity of their opportunity to work affects their earnings.

How many hours in a *day* do they work. How many can they. How many hours in a *year* do they work and how many can they. How much can they do in an hour.

How does the underground organization of the work affect the miner's opportunity to work. How does the organization of the industry affect his opportunity.

In the first place, it is commonly known that coal mine workers do not get a full year's work. Bituminous coal mining is *the* intermittent industry. Other industries may be seasonal, working perhaps for four months at a stretch followed by a period of two months of idleness. But coal mining rarely has a stretch of continuous work lasting a week. One hardly knows a day ahead if there is to be any work. The President's Bituminous Coal Commission of 1920 in the majority report (by Mr. Robinson and Mr. Peale) states:<sup>1</sup>

"Irregularity of mining operations is the primary cause of the unsatisfactory condition of the industry and results in high prices of coal and dissatisfaction among the miners."

The coal industry is a part-time industry, the number of idle days, out of a possible three hundred and eight working-days, being sixty-three in 1918 and one hundred and fifteen in 1919. On the average for the past thirty years, the number of possible working days, when the mines were not in operation, was ninety-three. This loss of time may be analyzed by causes for the last two years as follows:

Cause of Idle Time	1918	1919
	Per Cent	Per Cent
Car shortage .....	49	17
Labor shortage and strikes .....	23	25
Mine disability .....	14	6
No market .....	8	50
Other causes .....	6	2

<sup>1</sup> United States Bituminous Coal Commission. Majority and Minority Reports to the President, 1920. p. 25.

"It will be seen that in 1918, when the demand for coal was at its maximum, the principal cause of the lost time was car shortage, and, in 1919, when the war demand had ceased, 'no market' accounted for one-half of the idle days. Labor shortage and strikes accounted for about one-fourth of the lost time, and mine disability was responsible for 14 per cent in 1918 and for 6 per cent in 1919."

"In only a few instances, however, does the industry show a loss of time below seventy-eight working-days in a year, so that it is a fair interpretation of the facts that many days of idleness occur in the industry regardless of the general level of industrial prosperity."

The average figure of ninety-three idle days in a year, is 30 per cent of the possible days which a miner can work. The total number of days in which the bituminous miners have had opportunity for work averages two hundred and fifteen. Averages are poor guide posts. Some mines work more than the average and some work much less. There is no equality in the number of days worked by different mines.

It is not intended here to discuss the coal industry as a whole. Of it, the Bituminous Commission says:

"The coal industry, which was speculatively over-developed before the war, is still more over-developed now and employs more capital and more labor than is necessary to supply the present needs of the country."

"Full time employment in the coal mines can not, therefore, be expected until the industry is put on such a basis that only those mines remain in operation whose output is required to supply the annual needs of the country."<sup>1</sup>

Mr. Herbert Hoover has said, "Here is an industry functioning badly from an engineering and consequently from an economic and human standpoint. . . There lies in this intermittency not only a long train of human misery through intermittent employment, but the economic loss to the community of over one hundred thousand workers who could be applied to other production, and the cost of coal reduced."<sup>2</sup>

Mr. George Otis Smith, since 1907 Director of the United States Geological Survey, has characterized coal as a "diseased industry."<sup>3</sup>

<sup>1</sup> United States Bituminous Coal Commission, Majority and Minority Reports to the President, 1920.

<sup>2</sup> Proceedings. American Institute of Mining and Metallurgical Engineers, February 1920. Stabilization of Bituminous Coal Industry.

<sup>3</sup> Proceedings. American Institute of Mining and Metallurgical Engineers, February 1920. Stabilization of Bituminous Coal Industry. Fluctuations in Coal Production—their Extent and Causes. Geo. O. Smith. N.Y., February 1920.

The details of the things wrong in coal mining as an industry are given best in the majority report of the Bituminous Coal Commission and in the papers delivered before the American Institute of Mining and Metallurgical Engineers in February, 1920 on the subject of the Stabilization of the Coal Industry.<sup>1</sup> But the details wrong in *the organization of the daily work of coal mines*, as it affects the daily life of the coal miner, are hardly considered in these papers.

The point of view has been the surface point of view. The industry as a whole has been considered. No one has gone underground where the industrial unrest exists in the dark; where the details of trouble occur which make up the ocean of discontent.

The intermittency of work is a grand cause for discontent. It gives the excuse for organizing work underground in the manner that it is organized.

The intermittency varies not only from year to year, but also from month to month. Mr. George Otis Smith, (Fluctuation in Coal Production—A.I.M. & M.E. February 1920) has stated:

"Seasonal demand for bituminous coal causes, in normal years, a slump in production during spring and a peak of forced production in fall and early winter."

"To put it another way; even in years of active demand the present inequalities in the summer and winter buying of coal render inevitable a long period in which the labor and capital engaged in the industry cannot work more than twenty-seven to thirty hours of a forty-eight-hour week."

\* \* \* \*

"The year 1913 may be accepted as a fair type of the "odd" year when monthly fluctuations represent seasonal fluctuations only, uninfluenced by labor disturbances. In such a typical year the capacity required during the month of maximum demand will be from 35 to 40 per cent greater than in the month of minimum demands. In other words, a mine capacity and a labor force sufficient for November, if working full time, would be employed in April only 70 to 75 per cent of the time; and as in actual practice the mines never attain 100 per cent, or full time, even in November, but under the very best conditions reach only 80 per cent, the time of employment which may in fact be expected during April is about 58 per cent."

\* \* \* \*

"The rate in April 1919, was only 50 per cent of full time,

<sup>1</sup> The papers in the American Economic Review March 1921 should be included in this comment.



or twenty-four of a forty-eight-hour week. The highest percentage of full time ever averaged by the bituminous mines of the country for one week was 86.8, during July 7-13, 1918. The average for that month was 84.4 per cent."

Not only is there a variation from month to month and week to week, but there is a varying intermittency from day to day. Coal mines cannot work unless they have railroad cars, for the coal is dumped directly from the mine cars into the railroad cars. As regards the fluctuation in work from day to day. Mr. Smith has this much more to say:

"The railroad works seven days a week; the mines work six days. Over Sunday the carrier catches up in its work of placing cars, and in consequence the car supply on Monday is by far the best of the week. As a result, the miners work longest on Monday; but later in the week their hours of labor show a gradual decline, which is accentuated on Saturday by holiday absenteeism. Even if the mines could attain full time on Monday, they could not under the circumstances expect to work more than 86 per cent of the time on Friday and 79 per cent on Saturday. Of course the Monday rate never, in practice, gets up to 100 per cent, and the performance on the later days of the week is correspondingly defective."

A measure of how "in actual practice the mines never attain 100 per cent, or full time" is given in the weekly report on the production of bituminous coal of the United States Geological Survey for September 17, 1921. In this report there are two tables of comparison between August 1920 and 1921. During August 1920 the price of bituminous coal was the highest it has ever been and yet from the report of the United States Geological Survey we find that there was approximately 40 per cent, [only 2 to 4 per cent of which was due to strikes,] lost time during that period. During the depression period of 1921 we find that the lost time is almost 60 per cent (0.2 per cent due to strikes). As these reports to the Geological Survey are not obligatory, not all mines are included. But the report of the survey notes that for 1921 "the tonnage included is 59 per cent of the total for the country. The operations are not wagon mines, but all commercial properties of some size."

Detailing the number of mines and the number of hours in a week which they worked, the United States Geological Survey report states that during the boom period of 1920 only 337 out of 2840 mines worked full time and during the depression period of 1921 only 180 out of 2697 did the same. Further we find

that almost three-quarters of the rated capacity of the mines reporting worked in 1920 less than forty hours a week and in 1921 less than thirty-two hours. For the average it works out that during boom periods a miner can expect between three and four days a week of work; during depressions between two and three.

PERCENTAGE OF PRESENT FULL-TIME OUTPUT PRODUCED IN  
THE UNITED STATES BY ALL BITUMINOUS OPERATORS  
MAKING WEEKLY REPORTS

District		Per Cent Lost on Account of								
	Week Ended		Produced	Total Lost All Causes	Transportation Disability	Labor Shortage	Mine Disability	Strikes	No Market	All Other Causes and None Given
Total Reporting 1920	August 14	65.8	34.2	23.2	5.4	2.3	2.8	—	0.5	
	August 21	58.9	41.1	25.5	8.9	3.2	2.6	—	0.9	
	August 28	59.2	40.8	25.7	9.3	2.0	2.1	—	1.7	
	Sept. 4	59.9	40.1	28.1	5.1	4.0	2.3	—	0.6	
1921	August 13	43.0	57.0	0.7	1.1	0.1	2.8	51.9	0.4	
	August 20	42.8	57.2	0.7	0.8	0.2	3.5	51.3	0.7	
	August 27	43.1	56.9	1.4	2.2	0.2	2.9	49.6	0.6	
	Sept. 3	42.3	57.7	1.2	3.0	—	3.2	49.6	0.7	

Includes estimates for districts not reporting. Subject to revision.

Besides days of operation of the mine, there is an added feature of intermittency, which is the percentage of number of days of mine operation that the men in the mines actually work. There is hardly a miner who does not lose some days when the mine is in operation. There is a contrast between miners and company men in this loss of mine operating time.

The "company man," who is a day worker, gets paid for the number of hours which the mine works. He is likely to get additional pay because, as he is a man whose job is service and maintenance of the mine, he is likely to get work on days when the miner is idle. A motorman and a brakeman will be employed taking in rails. A tracklayer and his helper with a couple of drivers will be employed changing the ties and laying new rails along an entry. There is work which can best be done when the mines are idle; when they are not producing coal.

## FOUR HOUR DAY IN COAL

## WORKING TIME AT BITUMINOUS COAL MINES DURING WEEK ENDING AUGUST 20, 1921, COM-

(Based on reports to the Geological Survey from operators producing about 59 per cent of the output, excluding coal coked at mine.)

Time Group	Number of Mines		Per cent of rated capacity	
	1920	1921	1920	1921
Mines closed down entire week .....	96	970	1.8	21.0
Mines reporting production but working less than 8 hours ..	67	69	2.9	24.2
Mines working 8 and less than 16 hours .....	261	280	8.4	37.1
Mines working 16 and less than 24 hours .....	500	407	17.6	58.1
Mines working 24 and less than 32 hours .....	590	327	23.0	74.3
Mines working 32 and less than 40 hours .....	513	263	19.5	86.5
Mines working 40 and less than 48 hours .....	476	201	16.0	94.4
Mines working full time of 48 hours or more .....	337	180	10.8	100.0
Total, all mines .....	2,840	2,697	100.0	100.0

The "miner" is limited in the number of hours when he has opportunity to work by the number of hours which the mine actually works. And being a piece worker, his earnings are limited by the amount of work which he has opportunity to do, not by the hours during which he is ready for work.

The Bureau of Labor Statistics in its Study on the Wages and Hours of Labor in the Coal Mining Industry in 1919 gives a measure of the amount of time worked by both company men and miners, the basis of full time being all the hours in a period of two weeks, not only the hours which a mine worked. The table as given in the article is quoted here in part in Table 2.

TABLE—PER CENT OF BITUMINOUS COAL EMPLOYEES WORKING EACH SPECIFIED PER CENT OF FULL-TIME BY GROUPS OF OCCUPATIONS<sup>1</sup>

Occupations	Per cent of employees working each classified per cent of full time					
	Under 25	25 and under 50	50 and under 75	75 and under 100	Over 100	Total
Total, Mining Occupations . . . . .	6	19	52	21	2	101
Total, All Other Inside Occupations	7	9	29	34	15	100
All Inside Occupations . . . . .	6	16	45	25	5	100

It will be seen from the figures that over half the miners,—52 per cent—work from 50 to 75 per cent of the possible time and that only 2 per cent of them work full time and only 1 per cent more than full time. A total of 77 per cent work less than 75 per cent of the whole time. On the other hand, 6 per cent of the company men work full time and 15 per cent more than full time. These figures do not include officials of the company, but employees only. In contrast to the miners 52 per cent of whom worked from 50 to 75 per cent of the time, there are 55 per cent of the company men who worked 75 per cent or more of the time the mine worked. It can be seen from this that the piece workers work more intermittently than those who are paid by the day.

In comment on the figures obtained for bituminous coal mining, the article reads:

<sup>1</sup> The work of the miners is here classed as "mining occupations" and the men included under "all other inside occupations" are the company men. The total number considered was 26,445 miners and 9,744 company men working in 201 establishments.

"Thus of all employees working inside the mines only 8 per cent worked full time or over, while 67 per cent, two-thirds of the entire number, worked less than 75 per cent of full time. Outside employees show better conditions, 33 per cent working full time or over, and only 34 per cent less than 75 per cent of full time.

"A comparison of the hours of employees directly engaged in getting out coal, namely, hand miners, machine miners, and loaders, with the hours of employees in other occupations, indicates that conditions in the bituminous mines are in this respect much like those in anthracite mines. For only 3 per cent of the employees in the mining occupations worked full time or over, as against 21 per cent for other inside occupations and 33 per cent for outside occupations."

Not only are days of mine operation lost by the miners, but the majority of miners do not have eight hours of work in a day.

If they average four hours actually working while they are in the mine they are doing well.

The arrangement—the organization—of the work of a mine does not give the miner the opportunity to do more. The days of work are not only intermittent during the year, but the hours of work are also intermittent during the day. It is this intermittency underground which needs emphasis.

It is not the same as it is in a factory. A miner cannot walk through a door and, hanging up his hat and coat, be at his working place in three or four minutes. He has a distance to go before he gets to his working place. It may take him only twenty minutes to get there. It may take him more. He does not get any pay for this time spent traveling. Two extreme examples I know. In one mine where there was a "man trip"—a trip of empty cars hauled by a motor to take the men into the mine—it took fifty-five minutes to get from the outside to the working rooms. At another mine a young college man, working as a miner, kept a time record of all his work and he found that although his working place was only fifteen hundred feet in from the foot of the shaft, he used up twenty-four hours in two weeks getting to and from his working place.<sup>1</sup>

<sup>1</sup> The Bureau of Labor Statistics in its Study on the Wages and Hours of Labor in the Coal Mining Industry in 1919, has this to say: "It is estimated that in general it takes the miners from fifteen minutes to one hour to get from the bottom of the shaft to their working places. In new mines the time may be less than fifteen minutes and in old mines occasionally somewhat more than ■ hour."



Upon reaching his working place a miner can not expect to commence immediately to work and to earn. The first thing he needs is an empty mine car. If he worked late the day before he may happen to find the last car which he loaded on that day still waiting to be pulled from his place. If the seam of coal is dirty, the miner, while he is waiting for an empty car, can clean the coal and prepare it for loading. If he is a pick miner, he may be able to begin to undercut his coal, but the face has to be cleared before he can get at it. For the broken coal standing where it was blown down, lies loosely against the face. It is double work to clear the face, because the coal has to be turned over by hand and then shoveled again into the mine car, instead of being loaded directly.

If the miner is a "loader after machines," ("The statistics before the commission show that 57 per cent of the country's total production of bituminous coal is machine mined.") there is no mining for him to do. His job is to stand props and lay the track and load coal. Of these, loading coal has to be done first in order to make room to extend the track and to stand the props.

The chances are that the miner must wait until the transportation system has got running, before he can start to work.

In a few mines the attempt is made to have an empty car in every man's place at the beginning of the day. In other mines the attempt is made to have an empty trip in the entry so that the miner will have to wait only while the driver distributes the cars, a matter of a quarter, a half, or three-quarters of an hour. Often the attempt is made to have every mine car loaded with coal at the beginning of the day. In this case a miner will have to wait until a car has been emptied into the railroad cars at the tippie and brought into the mine.

An ordinary rate for dumping loaded cars is one a minute. The motor may take in twenty empties in a trip; a matter of twenty minutes to dump enough to make up a trip. Another ten minutes to make the run inside to the passing branch and then five minutes to switch and ten minutes more before the trip is in the entry ready to be distributed to the men: forty-five minutes gone and still the cars are not placed for the miners.

There is so much emphasis put upon getting out coal that often getting in empties is forgotten. The one cannot be done without first doing the other. At some mines a night shift is

employed so that in the morning all the mine cars are loaded with coal, leaving no empties with which the day miners can commence to work. Of course in such a case the first few hours of the day are completely disorganized with moving the cars in one direction. It is probably against such practices that the demand of the United Mine Workers was aimed when they asked before the recent Bituminous Coal Commission "that the double shift on coal for commercial purposes be abolished." The report of the Commission passes over this demand without discussion.

In most mines transportation at the beginning of the day is just as the end of the eight hours of the day before found it; jumbled up after eight hours of operating a mixed haulage system without measuring the time involved in traversing the unequal distances and depending upon the men to coordinate their work with a minimum of supervision.

It is no uncommon thing for a miner to wait one or two hours before getting a car into which he can load coal. Often he will wait three hours and maybe four.

After receiving the first car, the miner is about as uncertain when he will receive his second as he was about his first. He may get a car at 8 a.m., another at 10, another at 11:30 and another at 12 and then not know whether he will get any more before 3 or 4 p.m. A mine where a man can regularly get four and five cars in a day is a much sought mine. A car will ordinarily hold a ton and a half. Five cars would mean seven and a half tons for a daily tonnage. It takes no more than twenty minutes for one man to load a ton of coal into a mine car. In eight hours a man resting half the time, ought to load twelve tons; that is four hours work, twelve tons. The average daily output for the country as a whole is less than this. It varies around seven tons. Therefore, there is about three hours work a day for a miner. That is an average figure. A few men do much more. Twelve tons may be a standard for some mines. Many do less than the average. Some men in each mine are so situated that they have good opportunities for work and consequently earn good money. Many are not<sup>1</sup>

It is vital to the miner that he should receive a *full* supply of mine cars each day. An *equal* division of the cars between

<sup>1</sup> The presence and wording of the equal turn clause in union contracts (see page 45) speaks for the fact that the majority of miners are not working to capacity.

the miners working in the mines—an "equal turn"—is not entirely satisfactory. It prevents partiality toward one man or the careless sending of unequal numbers of cars to different entries, but it is unsatisfactory, not alone to one man but to two men, when both of them receive four cars a day and they each need eight in order to earn a day's pay. Equalizing a difference where one man got three and the other five is just, but it would be better to employ only one man than two at half time. When a miner sees no prospect of work, he goes home for the rest of the day.

Any one who will wander into a mining town will find miners going home from work at ten o'clock in the morning. They are easy to spot with their soot-smudged faces and dirty clothes and the tell tale cap which they wear. By noon the number going home will be larger. By quitting time in some towns, most of the miners will be out of the mine and many of them will be washed up and down town again. The customs of mining have given to the men the freedom of going home whenever they choose. It has come to be written in union contracts and even law. It is a costly custom, not alone from a production stand point, but to the men themselves, in that it breaks up the possibility of the organization of the underground work.

The Bureau of Labor Statistics has made a study of the actual hours worked.<sup>1</sup> In stating the conditions of their study, they show up the fact concerning the management of mines, in that *"In the case of occupations paid on a tonnage basis, miners, arrangements were made in advance with the management of the companies to keep a time record for the employees in those occupations for the selected payroll period."*

Notice the fact that a record of the time of the piece workers is not ordinarily kept and that special arrangement had to be made to get this information. "Because of the fact that the working places of the miners are widely distributed and at unequal distances from the bottom of the shaft, the time checked was the time when the miner entered and left the mine. Consequently all figures relating to the hours of those miners and miners' laborers who work on a tonnage basis represent the time spent in the mine."

<sup>1</sup> Monthly Labor Review, United States Department of Labor, Bureau of Labor Statistics. December 1919. p. 223.

TABLE 3.—AVERAGE FULL-TIME HOURS, HOURS OF OPERATION OF MINES, AND HOURS WORKED BY EMPLOYEES IN BITUMINOUS MINES IN ONE-HALF-MONTH PAY-ROLL PERIOD, BY STATES.

Miners, hand<sup>1</sup>

State				Average hours			Per cent		
	(1) Number of establishments	(2) Number of employees	(3) Full-time hours in half month	(4) Hours of operation in half month	(5) Hours employees actually worked in half month	(6) Column 5 is of column 4	(7) Column 6 is of column 5	(8) Column 6 is of column 4	(9) Column 6 is of column 4
Alabama	4	455	87.9	88.0	59.5	100.1	67.6	67.7	67.7
Colorado	16	1,268	104.0	73.6	61.4	70.8	83.4	59.0	59.0
Illinois	8	1,669	104.0	76.2	62.2	73.3	81.6	59.8	59.8
Indiana	4	525	80.0	70.1	56.6	87.6	80.7	70.8	70.8
Iowa	11	962	104.0	71.5	61.5	68.8	86.0	59.1	59.1
Kansas	12	1,482	104.0	68.9	53.7	66.3	77.9	51.6	51.6
Kentucky	10	192	93.5	69.5	53.8	74.3	77.4	57.5	57.5
Maryland	5	491	104.0	79.6	53.5	76.5	67.2	51.4	51.4
Missouri	5	629	102.9	70.1	57.3	68.1	81.7	55.7	55.7
New Mexico	6	528	104.0	76.2	71.7	73.3	94.1	68.9	68.9
Ohio	2	13	104.0	104.0	82.9	100.0	79.7	79.7	79.7
Oklahoma	7	354	104.0	94.8	64.9	91.2	68.5	62.4	62.4
Pennsylvania	28	1,859	100.2	80.0	64.0	73.3	80.0	58.6	58.6
Tennessee	7	307	88.2	61.7	49.6	70.0	80.4	56.2	56.2
Utah	5	206	104.0	51.8	61.9	49.8	119.5	59.5	59.5
West Virginia	5	168	111.4	71.4	58.0	64.1	81.2	52.1	52.1
Wyoming	4	169	104.0	68.2	54.6	65.6	80.1	52.5	52.5
Total	142	11,337	102.5	71.1	60.0	69.4	84.5	58.6	58.6

<sup>1</sup> One mine in Virginia omitted.

TABLE 3(2).—AVERAGE FULL-TIME HOURS, HOURS OF OPERATION OF MINES, AND HOURS WORKED BY EMPLOYEES IN BITUMINOUS MINES IN ONE-HALF-MONTH PAY-ROLL PERIOD, BY STATES.  
Miners, machine.<sup>1</sup>

State	(1) Number of establishments	(2) Number of employees	Average hours		Per cent			
			(4) Full-time hours in half month	(5) Hours of operation in half month	(6) Hours employees actually worked in half month	(7) Column 5 is of column 4	(8) Column 6 is of column 5	(9) Column 6 is of column 4
Colorado	11	66	104.0	76.2	69.5	73.3	91.2	86.8
Illinois	10	280	104.0	68.3	56.6	65.7	82.9	54.4
Indiana	7	136	80.0	50.5	47.2	63.1	93.5	59.0
Iowa	2	12	104.0	79.0	71.3	76.0	90.3	68.6
Kentucky	14	130	104.0	70.9	76.2	68.2	107.5	73.3
Missouri	6	112	104.0	83.2	65.0	80.0	78.1	62.5
New Mexico	5	35	104.0	70.1	74.7	67.4	106.6	71.8
Ohio	13	245	104.0	94.5	89.5	90.9	94.7	86.1
Oklahoma	2	12	104.0	92.0	75.6	88.5	82.2	72.7
Pennsylvania	26	546	110.8	85.5	81.0	77.2	94.7	73.1
Tennessee	3	15	84.8	65.7	56.0	77.5	85.2	66.0
Utah	7	22	104.0	53.1	73.4	51.1	138.2	70.6
Virginia	4	27	104.0	93.3	72.9	89.7	78.1	70.1
West Virginia	8	62	109.5	65.4	89.0	59.7	136.1	81.3
Total	118	1,700	104.3	77.9	73.2	74.7	94.0	70.2

<sup>1</sup> One mine each in Alabama and Wyoming omitted.



TABLE 3(3).—AVERAGE FULL-TIME HOURS, HOURS OF OPERATION OF MINES, AND HOURS WORKED BY EMPLOYEES IN BITUMINOUS MINES IN ONE-HALF-MONTH PAY-ROLL PERIOD, BY STATES.

Loaders									
State	(1)	Number of establishments	(2)	Number of employees	(3)	Average hours		Per cent	
						(4)	(5)	(7)	(8)
						Full-time hours in half month	Hours of operation in half month	Column 5 is of column 4	Column 6 is of column 5
						(4)	(5)	(7)	(8)
									(9)
Alabama	.....	2	307	104.0	62.3	95.9	92.2	65.0	59.9
Colorado	.....	8	389	104.0	65.4	81.8	78.7	80.0	62.9
Illinois	.....	9	2,049	104.0	57.4	68.0	65.4	84.4	55.2
Indiana	.....	7	1,098	86.0	45.7	54.2	67.8	84.3	57.1
Iowa	.....	2	67	104.0	60.2	78.9	75.9	76.3	57.9
Kentucky	.....	17	1,391	104.0	58.9	86.5	83.2	56.6	56.6
Missouri	.....	6	283	104.0	56.9	81.2	78.1	70.1	54.7
New Mexico	.....	5	132	104.0	77.4	84.1	80.9	82.0	74.4
Ohio	.....	13	1,970	104.0	76.8	93.1	89.5	82.5	73.8
Oklahoma	.....	2	135	104.0	68.0	95.1	91.4	71.5	65.4
Pennsylvania	.....	28	4,117	112.0	73.3	87.8	78.3	83.5	65.3
Tennessee	.....	4	119	87.0	46.0	60.1	69.0	76.5	52.8
Utah	.....	5	235	104.0	61.4	47.9	46.1	128.2	59.0
Virginia	.....	4	230	104.5	93.8	93.8	89.8	66.2	59.4
West Virginia	.....	13	749	108.3	61.1	80.5	74.3	75.9	56.4
Wyoming	.....	3	74	104.0	56.7	85.3	82.0	66.5	54.5
Total	.....	128	13,345	104.7	65.3	81.2	77.6	80.4	62.4

"From the figures given in the table (3) the immediate responsibility for idle time may be roughly apportioned between the management and the employees. Thus, the average full-time hours of all mines in which hand miners were found were 102.5 for the half month. Hand miners actually worked an average of 60 hours. The difference, 42.5 hours, was the amount of lost time on the part of the hand miners. But of these 42.5 idle hours there were on the average 31.4 hours during which the mines were not in operation. For that amount of idleness, 11.1 hours of idleness represent the time during which the mines were in operation and opportunity for work was given of which the employees failed to take advantage. For that much idleness, therefore, the miners were immediately responsible.

"For all machine miners combined the figures show average hours of idleness 31.1, of which the operators were responsible for 26.4 hours and the miners for 4.7 hours. The corresponding figures for loaders are 39.4, 23.5, and 15.9, respectively. The apportionment of responsibility in any particular state may be ascertained by a similar computation based on the averages given for that state."

Taking the figures for "miners, hand," who are the pick miners and those who blast off the solid,—60 hours out of a possible 71.1, it appears that they work on an average for the whole country 84.39 per cent of the possible time. As it is a known fact of coal mining that the miners rarely stay a full eight hours in the mines, the lost time can be proportioned to the hours of the day. 84.39 per cent of 8 hours is 6 hours and 45 minutes, which is the practical average working day. For Pennsylvania where a third of the coal of the country is mined, the figures are not quite as much as this, being 80 per cent of 8 hours which is 6 hours and 24 minutes. For Illinois the time worked and the hours of possible work are 62.2 and 76.2 which amount to 6 hours and 32 minutes. For Ohio it amounts to the same as Pennsylvania, viz. 6 hours and 24 minutes.

The "miners, machine," are the men who run the mining machines and do not load coal into mine cars. Their average per day according to these tabulations is 7 hours and 32 minutes. These men have more hours of work than the other piece work classes because it is advantageous to keep a machine busy and to get the advantage of the lower rate of coal loaded after machine mining. Sometimes they are paid by the ton and sometimes by the hour.

The loaders after a machine according to the figures in these tables work on an average for the country as a whole 6 hours

and 26 minutes a day. For Pennsylvania the figure is 6 hours and 41 minutes a day; for Illinois, 6 hours and 45 minutes. For Ohio, 7 hours and 35 minutes.

For the two classes who shovel coal into the mine cars, the average per day equals 6 hours and 34 minutes. Taking this figure of 6 hours and 34 minutes which the miners spend in the mine, the task is to find out how much of this time is spent in productive labor. The 34 minutes can be roughly stricken off as the time spent in getting to and from a working place. It may amount to more. It is not likely to be less. This leaves 6 hours in which the miner works. The average quantity of his work cannot be more than can be done in 6 hours. It may be less.

## CHAPTER V

### AMOUNT OF WORK FOR THE MINER

Mr. Arthur Thacher, during the discussions<sup>1</sup> of the paper of George Otis Smith before the February 1920 meeting of the American Institute of Mining and Metallurgical Engineers, when the chairman of the meeting, the retiring President of the Institute, put forward the question as to whether "there might be some method of increasing our production of coal with fewer men," made the following statement.

"I would like to say a few words on that, although I have not the full figures. The question there is a question of efficiency and civilization. It is how much the men can produce. The figures here roughly indicate that the production per day per man (total employees) in the coal mines was about four tons. I have not been able to get the figures from Illinois, but I think you will find that those figures are even lower.

"I would ask you, as engineers, to compare the Illinois coal mines with the Wisconsin zinc mines or the Joplin mines; they are right alongside of each other. I think if you saw them you would say that the man ought to produce as much coal as he can produce ore. But in the coal mines the production is four tons or less per man while in Wisconsin it is nearly 10 tons to the man. The figures in the latter district have been rising; they used to be under two. The mining and milling for last year was nine and one-half tons. But that figure is not what those men can do. A single month for mining and milling went over 13 tons to the man; a single day was up along 18 tons. There is no question but that with further progress along that line, without any change of machinery or anything else, those figures can be put to 20 tons. Apply the same methods to your coal mines and you have the solution for the labor. We have men enough for it; they can do it."

Having been taken to task for this statement Mr. Thacher replied:

"I have had no personal experience in a coal mine, so it is with a good deal of diffidence that I rise in the presence of all you coal men to say what a coal miner can do. I must, however,

<sup>1</sup> Proceedings. American Institute of Mining and Metallurgical Engineers. Stabilization of Bituminous Coal Industry. Discussion of papers. March 1920. Sec. 3.

take issue with Mr. Ludlow when he talks about 10 tons as being what they can do. I have talked with a number of operators in Illinois, and I know (as it used to be in the old union rules, and they are practically in force, although I believe they are not written) they do hold the men to 10 tons or very near that. But some operators in Illinois, who were a little isolated and were not watched quite as closely, have made 20 tons, and in one instance, 50 tons.

"In comparing shoveling, I recognize the fact that coal is just about twice as bulky (as zinc ore) so that we must load twice as many cars; but it is not twice the work because the material is lighter for each shovelful or each car. I remember the day very well when we could get about 15 tons to the man; we thought we did pretty well when we got 20 tons, but when the war broke out, we figured that 50 tons was the lowest average of every shoveler underground, and in several of our mines 60 and 70 was the average. We lost our men at that time, most of them enlisting and the balance being drafted, and had to train negroes. They started in with 15 to 20 tons but they have gotten over 40 tons; we are now getting back a few of our old shovelers.

"One day just before the war, when the men were trying to make a record, they shoveled 858 tons, or a little over 95 tons to the man for the shift. Two or three weeks ago, I met one of the men that had just come back from war service, and I remarked that he was pretty old to be in the war. 'Why', he said, 'I am only fifty-three years old.' As he was shoveling pretty well, I said, 'What are you doing on your shoveling.' He said, 'Pretty well. I made 75 tons yesterday.' I said, 'Will you make it today.' He said, 'I think so.' Then he went on to tell me that the other fellow who came back with him went 100 tons the day before and one day during the week before he had shoveled 110 tons. Of course I know you think those figures are high, but the men can do it and they are doing it. We pay them about 12 cents a ton, and on 60 or 70 tons, they are making pretty good wages. One man had, for the year's wages, over 15,000 tons. Our future lies in bringing up these figures. I do not say every one can do that, but it can be done if the men want to. Clerks from the office have made 50 tons."

(While Mr. Thacher was making these remarks the man behind me, whom I had not noticed and never knew, confided to his friend in a whisper, "If I did not know him well I would call him a liar.")

Mr. Smith, Director of the United States Geological Survey, followed Mr. Thacher and made the explanation.

"The four tons a day referred to by Mr. Thacher is the average for the country, and it is not the average for eight hours' work, necessarily. Some of the best work is done in a much shorter day by the most efficient men. Some operators can tell of the large tonnages that enter into that four-ton average per day for the United States."



Mr. Smith was followed by Mr. R. Dawson Hall, Managing Editor of *Coal Age*, who said in part:

"As to what the miner does, in comparison to what he could do, I think a great deal may be said. We have pitched our plane altogether too low in the coal mining industry.

\* \* \*

"There is very little doubt but that the coal miner could produce more. But there are two reasons why he does not; one is that he does not want to, and the other is that the operator does not really give him the opportunity that he should have, if it were to the economic advantage of the operator to aid him in his production. Unfortunately, the miner is paid by the ton, and not by the day; consequently, the operator is not interested particularly in how many tons he gets out, except as it reduces the overhead. He cannot afford to have a single day man idle, but he can afford to have idle several miners who are paid by the ton."

It is aside from the point but is typical of mining that the speaker who followed Mr. Hall diverted the discussion to machinery when it was progressing in the direction of "efficiency and civilization."

Accurate figures on how many tons a miner averages per day are not easy to get. Approximate figures, on the safe side of not being too low, can be obtained.

In the reports of the mining departments of the different states can be found the material on which an estimate can be made on how much is done in a day by a miner. From that one can tell how much of the six hours spent at the face is used in productive work. Figures from the state reports have to be taken with the knowledge that two of the three factors are likely to be inexact yet close enough for our purpose. The three items wanted are (1) the number of tons mined by a, (2) certain number of miners in a, (3) definite number of days.

The number of tons in the state reports can be taken as correct, but the number of days in many cases is too low and the number of miners is to be distrusted. State reports are gotten up with the purpose of showing the *number of accidents* and the *number of tons* mined. They are a record of the safety of the mines. To use them to show the production per man per day, the figures have to be rearranged and the figures whose accuracy is essential for production are not as essential to the subject of safety and are not so accurately recorded.

As a general fact the recorded number of days worked is low

in the case of totals for any district and for the state as a whole. It is low because the number of days worked by the different mines is averaged, small mines—a “snow bird” or a “country bank,”<sup>1</sup>—working only a few days, are given an equal value with the large producing mines, which work a maximum number of days. For instance, in the 9th Bituminous District of Pennsylvania the 1917 state report gives the average number of days worked for the district as 259, whereas if this was corrected on a basis of the number of men employed and the total man-days (8 hour shifts) worked, the average number of days of work for a miner would be 290; an error in this case of 12 per cent. As the totals for the districts are too low, the total for the state is too low—again merely averaged.

In the number of miners employed again the figures have to be taken with the knowledge that they are low. The reports with one exception do not give an actual count of the number of miner-days. Instead an even figure is given of the number of miners. As only about 80 or 90 per cent of the number on any payroll come out to work on any day when the mine is in operation, it is always a question, when a company is sending in the information, how many miners to report. Frequently a number equivalent to the number who come out to work will be reported, an approximate figure without reckoning all the variations in numbers employed. The natural tendency is to report less than the actual number of miners—to be conservative.

However in making calculations from the state reports,—dividing the number of days (low) times number of men (low) into the tonnage reported—it can be safely taken that the tonnage per man per day will not be shown as too low, but on the contrary that a safe margin exists over what would actually be found if measured in each mine.

### *Illinois*

The Illinois State report for 1919 says: “Taking the shipping mines as a basis for comparison with last year, this report shows an increase of 3 mines but a decrease of 55 employees and of 38 days in working time, with a consequent decrease of 14,544,507 tons. An analysis of these figures show that the average tons per man per day is practically the same and shows that while

<sup>1</sup> Report of the Department of Mines, Part II, Bituminous Pennsylvania. 1917. p. 58. Table AA. Part I.

at work the miners accomplished the same results as when under the stress of war time activities."<sup>1</sup>

The figures for Illinois are as follows:

	1919	1918
Number of shipping mines	373	370
Output of shipping mines, tons	73,751,721	88,306,228
Average days of operation, shipping mines	192	230
Number of employees, shipping mines	87,962	88,017
Average tons per man per day (calculated)	4.34	4.37
Percentage which pick and machine miners are of total employees (calculated)	58.7	
Tonnage per miner per day—average (calculated)	7.4	

### Ohio

The Ohio 1917 report on coal mines gives the following figures:

"A daily average production of 3.9 tons during 1917 was reported for the pick miners in pick mines; 46.1 tons for machine runners and helpers; and 7.3 tons for loaders, including drillers and shooters. The only notable increase is in the last of these figures, which is the highest reported in twenty-three years, or since 1895. The daily output of 46.1 tons for machine runners and helpers is 4.5 tons less than was reported for 1916, but is a slight increase over both their previous five and ten year average daily production."

### Pennsylvania

Pennsylvania is the biggest coal mining state, producing practically all the anthracite mined in the country and about a third of the bituminous coal. The figures for the year 1917, are as follows.<sup>2</sup>

Number of tons produced	171,074,411
Number of miners employed	97,976
Average (number of) days worked	239
Average tons per miner per day (calculated)	7.30
(Number of) inside employees	147,699
(Number of) tons per inside employees per day (calculated)	4.845

The average tons per miner per day for Pennsylvania of 7.30 compares about equally with the 7.40 from Illinois. In the state

<sup>1</sup> Bulletin of the Thirty-eighth Annual Coal Report of Illinois, Department of Mines and Minerals. Illinois State Journal.

<sup>2</sup> Report of the Department of Mines, Part II. Bituminous Pennsylvania. 1917. Table AA. Part I. p. 58.

reports of both states are included reports from the districts giving detailed figures for each mine.

Examining in detail the various districts of Pennsylvania to learn what variations go into making the average figure of 7.3, one finds that in some districts the tons per miner per day average between ten and eleven which is the high and that others drop to between five and four which is the low. Particularly will one find that in comparable districts, the same results are not obtained.

If in turn one examines the district reports so as to learn the variations between companies, one finds even more strikingly that for comparable conditions of mining the same results are not obtained in the matter of tons per miner per day. With individual mines one finds examples of all the combinations which are possible. One finds mines with a high output per miner per day and then, with its serious effect on the workman, the days of operation will be far less than the district as a whole. One can find numerous examples where, pick and machine mining occurring in the same mine (as is usual), the pick miners loaded more tons per day than the machine loaders, though the pay and the custom are based on the contrary being accomplished, machine miners being paid at a fraction of the pick mining rate as they do not have as much work to do on each ton of coal.

It has been within the author's experience to go over the work of mines where such conditions existed and to find continuous trouble with the men. For the theory of the miners is that all the miners should earn approximately the same. Yet in any mine where any one class earns much more than another, one finds the men anxious to get into that class. And where one finds the men with the highest piece rate getting the most opportunity to work, one finds much discontent.

The costs of mining too are high in such a case.

In contrast to those mines where the advantage in earnings is on the side of the pick miners—the high piece rate men—there are mines where they are working at a disadvantage. If the difference in the rate per ton is approximately the measure of equality, then a loader after machines should load about a ton

and a third for each ton loaded by a pick miner. In some mines this ratio is exceeded, the machine men loading out more than their proportion. In such a case it can be predicted that it will be hard to get a miner to take a pick place, because the earnings from machine mining will be so much greater. Such a case is advantageous to the cost of mining.

The hardest thing to find in the state reports is a mine where a correct ratio is maintained in the outputs per day of the pick and machine miners. Around the mines stress is laid upon the fact that natural conditions vary from mine to mine, and this is used as an excuse for not doing as well as somebody else at some other mine. The variation is over emphasized.

Forty-eight inches is the critical height of a seam for shoveling. It is a little more than the height of the top of a man's back when he is doubled over. With forty-eight inches a man, though he cannot stand up straight can shovel without bending or spreading his legs and can swing a shovel freely with his arms outstretched. His arms do not have to be drawn up to prevent the shovel from touching the ground during a swing. Any height above forty-eight inches is that much more advantage for the loading of coal.

### *Kansas*

The latest available report for the state of Kansas which has lately created an industrial court because of the continued unrest that existed among the miners of that state, is for the year 1916. Crawford County in that state produced in 1914, 67 per cent of the total output of the state; in 1915, 68 per cent and in 1916, 72.5 per cent. Figures taken from a later report might be more assuring, but it is not probable that during the intervening years, a miner's muscular development has changed much. His capacity for doing work is about the same and pick mining has not changed in character in many years.

In the 1914 and 1915 reports are found tables giving the number of days worked and the number of tons mined per miner during the year. It is a simple matter of calculating from this the number of tons per miner per day. Tabulations showing the results of sampling the state reports are presented in Table 7.



TABLE 7.—AVERAGE NUMBER OF DAYS MINES WORKED AND AVERAGE NUMBER OF SHORT TONS PRODUCED PER MINER PER YEAR AND PER DAY IN CERTAIN MINES OF CRAWFORD COUNTY, KANSAS, FOR THE YEARS 1914 and 1915<sup>1</sup>

Mine No.	Number of Days Worked		Average Short Tons Per Miner Per Year		Average Short Tons <sup>2</sup> Per Miner Per Day	
	1914 <sup>3</sup>	1915 <sup>4</sup>	1914	1915	1914	1915
1	275	242	1,145	1,036	4.17	4.28
2	268	240	953	897	3.55	3.74
3	265	139	1,118	828	4.22	5.95
4	206	239	998	1,516	4.84	6.35
5	154	223	666	785	4.32	3.52
6	216	184	868	692	4.02	3.76
7	207	121	859	679	4.15	5.61
8	233	186	837	862	3.59	4.64
9	217	193	887	841	4.08	4.35
10	98	127	646	860	6.60	6.77
21	80	115	386	702	4.83	6.10
22	227	147	571	555	2.52	3.77
23	241	244	784	803	3.26	3.29
24	174	121	649	541	3.73	4.47
25	173	175	710	543	4.10	3.10
26	228	317	798	709	3.50	3.26
27	208	214	465	792	2.24	3.70
28	159	248	587	783	3.69	3.16
29	244	64	816	215	3.34	3.36
30	182	220	359	751	1.97	3.42
41	218	146	757	781	3.47	5.35
42	197	190	708	740	3.60	3.90
43	230	195	805	688	3.50	3.53
44	132	122	531	659	4.02	5.40
45	181	104	723	640	4.00	6.09
46	220	216	763	712	3.47	3.30
47	186	200	946	987	5.08	4.94
48	233	250	924	1,008	3.96	4.03
49	218	201	828	501	3.80	2.49
50	268	270	1,661	973	6.20	3.60

The mines were taken as they came in the report, from 1 to 10, 21 to 30, and 41 to 50, in the County of Crawford. There are more mines, but the results from the rest would be similar. It will be seen from the last column that there are a couple of sixes and a few fives and several fours and a number of threes in the tons per miner per day both for 1914 and 1915. In 1914 the highest mine for output per miner per day is number 10 with

<sup>1</sup> Crawford County produced 67 per cent of the output of the State in 1914 and 68 per cent in 1915.

<sup>2</sup> Last column calculated from data given.

<sup>3</sup> State of Kansas. Department of Labor. Thirtieth Annual Report. 1914.

<sup>4</sup> State of Kansas. Report of the Inspection of Coal Mines and Coal Production. Report ending December 31, 1915.

6.60—but the mine only worked 98 days. The next highest is 6.20 and there the men worked 268 days. In 1915 mine number 10 was again high in output per day—6.77—but again low in days worked—127. And mine number 50 drops in output per miner from 6.20 to 3.60. In 1916 this mine worked 265 days and the output per miner per day was 3.64 tons.

In the 1916 report of Kansas the same tables as in the two preceding years were not included, so that calculations have to be made, the essential figures being given in Table 8.

TABLE 8.—AVERAGE NUMBER OF SHORT TONS PER MINER PER DAY FOR THIRTY MINES IN CRAWFORD COUNTY, KANSAS, IN 1916<sup>1</sup>

Mine No.	Number of Tons	Number of Miners	Number of Days	Miner-days <sup>2</sup> per Year	Number <sup>2</sup> of Tons per miner per day
1	132,652	133	270	35,900	3.70
2	163,400	166	270	44,800	3.65
3	22,414	22	245		
4	86,245	70	266	18,600	4.64
5	3,271	80	135 <sup>6</sup>		
6	52,400	109	175	19,100	2.75
7	92,025	171	164	28,050	3.28
8	151,355	235	185	43,600	3.47
9	116,779	173	218	37,700	3.10
10	132,340	245	156	38,300	3.46
21	2,912	15	40		
22	118,704	158	250	39,500	3.05
23	8,366	11	130		
24	104,790	145	211	30,800	3.41
25	136,157	150	250	37,500	3.63
26	84,558	130	207	27,000	3.13
27	136,964	182	238	43,300	3.16
28	105,345	121	236	28,600	3.69
29	18,828	53	116		
30	100,457	120	267	32,100	3.13
41	49,016	51	246	12,550	3.91
42	1,956		73		
43	50,446	83	246	20,400	2.01
44	67,472	111	198	22,000	3.06
45	112,352	161	214	34,500	3.25
46	73,164	112	197	22,100	3.31
47	111,470	125	223	27,000	4.00
48	23,225	37	164	6,070	3.83
49	22,388	40	94		
50	4,523	29	42		

<sup>1</sup> As given by State Report, Crawford County Produced 72.5 per cent of the output of Kansas.

<sup>2</sup> Last two columns calculated. Calculations made with a slide-rule.

It will be seen that the result from most of the mines lies between three and four tons, a low figure.

*Washington*

The annual report of coal mines for the state of Washington gives the daily average short tons per employee, both inside and outside the mines, for the years 1918 and 1919, as 2.65 and 2.62 respectively.<sup>1</sup> This is based on the number of man-days worked and includes all employees. Of the different counties in the state, Kittitas is the largest producer and the most comparable to other regions of the United States because the method of mining is room and pillar. In the next largest producing county the seams of coal stand on a greater angle so that many are operated by the chute and pillar or breast and pillar methods as are most of the anthracite mines of Pennsylvania. In Kittitas County the output per employee is given as 3.60 tons per day.<sup>2</sup> As the number of men-days worked inside the mine is given as 291,731, this figure can be divided into the total output from the county, of 1,322,534 tons for 1919, giving a figure of 4.53 to compare to the 4.84 tons per inside employee per day obtained from the 1917 figures for Pennsylvania, and giving a final result for miners of about seven tons per day.

The figure from Washington is more accurately determined because in getting information from the operators it was requested "that the number of full days each mine was operated be given, and also the number of eight-hour shifts (men-days) worked inside and the number of men-days worked outside be given, exclusive of the shifts worked by office workers." And in addition there is a contrast to the usual uncertainty in the matter of numbers employed, contained in other state reports, for the next sentence in the report is: "the average number of employees is then found by dividing the men-days by the full days worked."<sup>3</sup>

So comparing various places, as far apart as the states of Washington and Pennsylvania, it can be taken that a miner on an average will load into mine cars somewhere between seven and eight tons a day. This does not compare favorably with the assertions of Mr. Thacher before the American

<sup>1</sup> State of Washington. Annual Report of Coal Mines for the year ending December 31, 1919. James Bagley, State Mine Inspector. p. 16.

<sup>2</sup> Ibid: For the year ending December 31, 1918.

<sup>3</sup> Ibid; for the year ending December 31, 1919. p. 13.

Institute of Mining Engineers that in the metal mines they start men at fifteen tons a day and that "clerks from the office have made fifty tons."

### *Time Involved*

The Pennsylvania figure of 7.30 tons per miner per day can be taken as an "about correct" figure to calculate in a broad way the average time which a miner spends in productive work. As the two classes who load coal into the mine cars do not have the same amount of work to do on a ton of coal, the average tons must be proportioned between pick miners and machine miners. In Pennsylvania the percentage of pick miners in 1917 was 53 and of machine miners 47; almost equal. So as machine miners are paid at a lower rate and have less work to do on a ton of coal, they should load more than the average 7.30 tons and the pick miners being in the opposite position should do less than the average. If the difference in pay is the measure of the amount of work then machine miners should be counted upon for 8.2 tons per day and pick miners for 6.4 tons per day.

Knowing the amount of work done by the average miner, the time spent working can be approximated. As it takes twenty minutes to load a ton of coal, the pick miner loading 6.4 tons a day will spend one hundred and twenty-eight minutes shovelling coal into mine cars. In addition he will spend about thirty-five minutes mining the coal, fifteen minutes drilling holes and preparing blasts and thirty minutes standing props and extending track and doing the regular things which have to be done. Altogether it amounts to about two hundred and ten minutes in a day or three and a half-hours.

For the machine miner, it will amount to the same because the time spent by the pick miner in mining coal is spent by the machine miner in shoveling coal into mine cars. Work such as standing props is equal for both classes of work.

*We have therefore brought out that the miner spends six hours a day in his working place and during that time, spends three and a half hours at work, and two and a half hours waiting for work and loafing.*

Totaling the number of hours in a year which a miner spends at remunerative work, we find that he averages somewhere between 200 to 230 days when the mine is in operation and he consequently has a possible chance to work. Two hundred days would give him 650 hours of remunerative work; 230 days, 805

hours. Out of a total time of 300 eight-hour working days in a year, or 2400 hours, a miner spending from a quarter to a third of this time in remunerative labor *loses a matter of sixteen hundred hours during the year, when he ought to be of service to the community and to himself.*

From a quarter to a third of the lost time can be accounted for by the fact that the mine is not in operation, due to the organization of the industry, "which was speculatively over developed before the war" and "is still more over developed now and employs more capital and more labor than is necessary to supply the present needs of the country." Together with that over development comes the seasonal demand and the difficulties of railroad transportation and supply of railroad cars at the mines. The public is partly to blame for this state of affairs which has arisen through the lack of control over a natural resource.

Equal to the amount of time lost through the seasonal operation of mines comes the time lost through underground mismanagement of mines.

*The miner working only a quarter to a third of the possible working time in a year, must attempt in those hours to earn enough to support himself and his family for a full year. He must struggle to have his piece rate high enough to accomplish this. He must struggle against the effect of unemployment within employment and of idleness.*

#### *How Much Work Is Possible*

From the Illinois record of grievances, which will be given in the next chapter, can be taken a case to show how much work a miner can do in a day, which is a pertinent question in view of the fact that the records show that a miner only loads between seven and eight tons of coal a day.<sup>1</sup> It is quoted here in full:

CASE 5380.<sup>2</sup> FILE 1060

ENTERED JULY 22, 1918

A miner asked pay for alleged lost time. His roadhead caved in and he was employed to load out the rock at one hour per

<sup>1</sup> A high exception to the average can be found in the article New Mining Methods in the Connellsville Region, by Patrick Mullen—Coal Age, 1917—"The average of all the loaders behind shortwall mining machines in all the mines of the company for the month of August, 1916, was approximately 19 tons per shift."

<sup>2</sup> Illinois Coal Operators Association. Monthly Bulletin. July 1918.



car and on one day he was given only seven cars to load and insisted that he should be paid eight hours for the shift.

It was taken up at the mine July 10th by Commissioner O'Connor and Sub-district President Maconno and referred to the joint board. At meeting of joint group board No. 1 held in Chicago, July 31st, August 1st and 2nd the following motion carried:

"In view of the fact that this man worked all day and the joint board is unable to determine from the evidence whether or not he was offered a chance to load eight cars on the day in question, we agree to allow him one hour to settle the case, with the understanding this shall not establish a precedent."

The explanation of this case as the record shows it, is that there was a fall of rock in a miner's working place and that to get at the coal again it was necessary to clean it up. In doing so the miner would have to break the rock into chunks which could be loaded into a car and those who have done such work know that it is harder to load rock than coal. The work is comparable to loading after machines. The height of coal in this mine was three feet. A car of rock weighs more than a car of coal. It can be assumed that this car was an ordinary one holding a ton and a half of coal or two tons of rock. So eight cars of rock would be sixteen tons. There are several days involved in this case and on all but one the man loaded his sixteen tons of rock; on one day he was not given the full number of cars and he complained. The loading of sixteen tons of rock is more than double the amount of work involved in loading 7.4 tons of coal which is the Illinois average including the results obtained in seams of high coal. If a man could break up and load sixteen tons of rock, he ought to be able to load eighteen or twenty tons of coal. At any rate, here at least, was one miner, who, assured of a full day's pay, was willing to do sixteen tons of work, which was at a rate per ton about thirty cents under the rate on coal.

There is another fact shown concerning mining and the records which are kept, namely that the joint board was unable to determine from the evidence whether or not the man was offered a chance to load his eight cars on the day in question.

Another case which shows that men accustomed to work can do more than the state averages show they generally do, is case No. 2650, July 1915, from a mine where the seam of coal is seventy-eight inches. The men here complain of a low oppor-

tunity to work as they were only loading six to seven tons a day. The case also shows two innocent men ground between the upper and the nether millstone. It is as follows:

Case 2650. File 1136

Entered July 17, 1915

The company recently increased the number of machines in this mine from eleven to twelve and transferred two loaders, who were machine runners, from the face to operate the additional machine. The pit committee refused to allow the new machine to start, claiming the turn of the mine was only from six to seven tons daily. The company refused to allow the two

RELATION OF PERCENTAGES OF TOTAL NUMBER OF MEN TO  
PERCENTAGES OF TOTAL PRODUCTION FOR A PICK  
MINE DURING 14 DAYS OF WORK.

Classification by 1,000 of Pounds Load- ed in Two Weeks	Number of Men	% of Total Men	Cumulative Per Cents	Cwt.	% of Total Cwt.	Cumulative Per Cents
330	0					
320	1	0.66	0.66	3,218	1.5	1.5
310	0					
300	1	0.66	1.32	3,041	1.4	2.9
290	2	1.31	2.63	5,841	2.7	5.6
280	0					
270	1	0.56	3.29	2,797	1.3	6.9
260	1	0.66	3.95	2,632	1.2	8.1
250	2	1.31	5.26	5,137	2.4	10.4
240	2	1.31	6.57	4,847	2.2	12.6
230	4	2.62	9.19	9,507	4.4	17.0
220	6	3.94	13.13	13,517	6.3	23.3
210	2	1.31	14.44	4,387	2.0	25.3
200	14	9.22	23.65	28,536	13.2	38.5
190	11	7.25	30.91	21,497	9.9	48.4
180	6	3.94	34.85	11,136	5.2	53.6
170	12	7.90	42.75	19,247	8.9	62.5
160	4	2.63	45.38	6,559	3.0	65.5
150	5	3.28	48.66	7,824	3.6	69.1
140	6	3.94	52.60	8,592	4.0	73.1
130	7	4.60	57.20	9,465	4.4	77.5
120	10	6.57	63.77	12,355	5.7	83.2
110	6	3.94	67.71	6,843	3.2	86.4
100	4	2.62	70.33	4,242	2.0	88.3
90	4	2.62	72.95	3,866	1.8	90.1
80	2	1.31	74.26	1,751	0.8	90.9
70	13	8.56	82.82	9,887	4.6	95.9
60	3	1.97	84.79	2,022	0.9	95.4
50	3	1.97	86.76	1,616	0.7	97.1
40	6	3.94	90.70	2,615	1.2	98.3
30	4	2.62	93.32	1,721	0.8	99.1
20	2	1.31	94.63	514	0.02	99.12
10	4	2.62	97.25	679	0.03	99.15
0	4	2.62	99.87	296	0.01	99.16
Total	152			216,187		

# AMOUNT OF WORK

83

RELATION OF PERCENTAGES OF TOTAL NUMBER OF MEN TO  
PERCENTAGES OF TOTAL PRODUCTION FOR A MACHINE  
MINE DURING 14 DAYS OF WORK.

Classifica- of Pounds	Number of Men	% of Total Number of Men	Adding %s Progress- ively	Cwt.	% of Cwt.	Adding %s Progress- ively
400	1	1.05		4,002	2.11	
390						
380	1	1.05	2.10	3,877	2.04	4.15
370						
360	1	1.05	3.15	3,664	1.92	6.07
350	2	2.10	5.25	7,131	3.75	9.82
340	2	2.10	7.35	6,954	3.67	13.49
330						
320	1	1.06	8.41	3,288	1.73	15.22
310	3	3.18	11.59	9,521	5.00	20.22
300	4	4.22	15.81	12,209	6.44	26.66
290	3	3.18	18.97	8,843	4.66	31.32
280	4	4.22	23.19	11,350	5.98	37.30
270	4	4.22	27.41	11,030	5.80	43.10
260	2	2.11	29.52	5,298	2.79	45.89
250	2	2.11	31.63	5,078	3.68	48.57
240	2	2.11	33.74	4,953	2.61	51.18
230	7	7.37	41.11	16,307	8.60	59.78
220	3	3.16	44.27	8,831	4.66	84.44
210	4	4.22	48.49	8,587	4.52	68.96
200	4	4.22	52.71	8,044	4.24	73.20
190	1	1.05	53.76	1,930	1.02	74.22
180	3	3.16	56.92	5,518	2.91	77.13
170	4	4.24	61.16	7,098	3.73	80.86
160	1	1.05	62.21	1,698	0.90	81.76
150	4	4.22	66.43	6,066	3.19	84.95
140	3	3.16	69.59	4,377	2.30	87.25
130	3	3.16	72.75	4,046	2.13	89.38
120	5	5.27	78.02	6,386	3.37	92.75
110	5	5.27	83.29	5,641	2.98	95.73
100	1	1.05	84.34	1,080	0.57	96.30
90	1	1.05	85.39	908	0.48	96.78
80	4	4.22	89.61	3,353	1.76	98.54
70	1	1.05	90.66	716	0.38	98.92
60						
50	1	1.05	91.71	523	0.26	99.18
40	2	2.11	93.82	889	0.47	99.65
30						
20	1	1.05	94.87	234	0.12	99.77
10	3	3.18	98.05	367	0.19	99.96
0	2	2.10	100.15	62	0.03	99.99
Total	95			189,839		

## FOUR HOUR DAY IN COAL

RELATION OF PERCENTAGES OF TOTAL NUMBER OF MEN TO  
THE PERCENTAGE OF TOTAL PRODUCTION FOR A PICK  
AND MACHINE MINE DURING 14 DAYS OF WORK.

Classifica- tion by 1,000 of Pounds	Number of Men	% of Total Number of Men	Cumulative Per Cents	Cwt.	% of Cwt.	Cumulative Per Cents
410	1	.95	.95	4,186	1.79	1.79
400	2	1.90	2.85	8,042	3.43	5.22
390						
380						
370	2	1.90	4.75	7,477	3.19	8.41
360	3	2.86	7.61	10,915	4.65	13.06
350	1	.95	8.56	3,571	1.52	14.58
340	4	3.81	12.37	13,843	5.90	20.48
330	2	1.00	14.27	6,733	2.87	23.35
320	4	3.81	18.08	12,962	5.54	28.89
310	5	4.76	22.84	15,704	6.71	35.60
300	6	5.71	28.55	18,491	7.90	43.50
290	4	3.81	32.36	11,869	5.86	48.56
280	3	2.86	35.22	6,576	3.68	52.24
270	3	2.86	38.08	8,218	3.50	55.74
260	6	5.71	43.79	15,849	6.78	62.52
250	2	1.90	45.69	5,083	2.17	64.69
240	2	1.90	57.59	4,936	2.10	66.79
230	2	1.90	49.49	4,769	2.02	68.81
220	2	1.90	51.39	4,435	1.89	70.70
210	9	8.57	59.96	19,372	8.25	78.95
200	1	.95	60.91	2,097	.88	79.63
190	4	3.81	64.72	7,860	3.38	83.21
180	6	5.71	70.43	11,052	4.81	88.02
170	7	6.67	77.10	12,348	5.26	93.28
160						
150	2	1.90	79.00	3,063	1.31	94.59
140	4	3.81	82.81	5,802	2.49	97.08
130	1	.95	83.76	1,384	.59	97.67
120						
110	1	.95	84.71	1,108	.48	98.15
100						
90	1	.95	85.66	996	.42	98.57
80	1	.95	86.61	896	.38	98.95
70	1	.95	87.56	754	.32	99.27
60						
50	1	.95	86.51	571	.24	99.51
40						
30	1	.95	89.46	342	.15	99.66
20	1	.95	90.41	260	.12	99.78
10	4	3.81	94.22	658	.28	100.06
5	3	2.86	97.08	232	.10	100.16
1	2	1.90	98.98	46	.02	100.18
Total	104			234,502		

men taken from the face to return to loading and they were thrown idle.

Commissioner Cahill and Board Member Dobbins met at the mine July 7th and referred the question to the joint board. President Moderwell and Vice-President Hefferly later appointed a joint committee to visit the mine with a view to settling the dispute. On August 24th Mr. James Forester, for the operators, and Board Member Burton, for the miners, met at the mine but failed to reach an agreement.

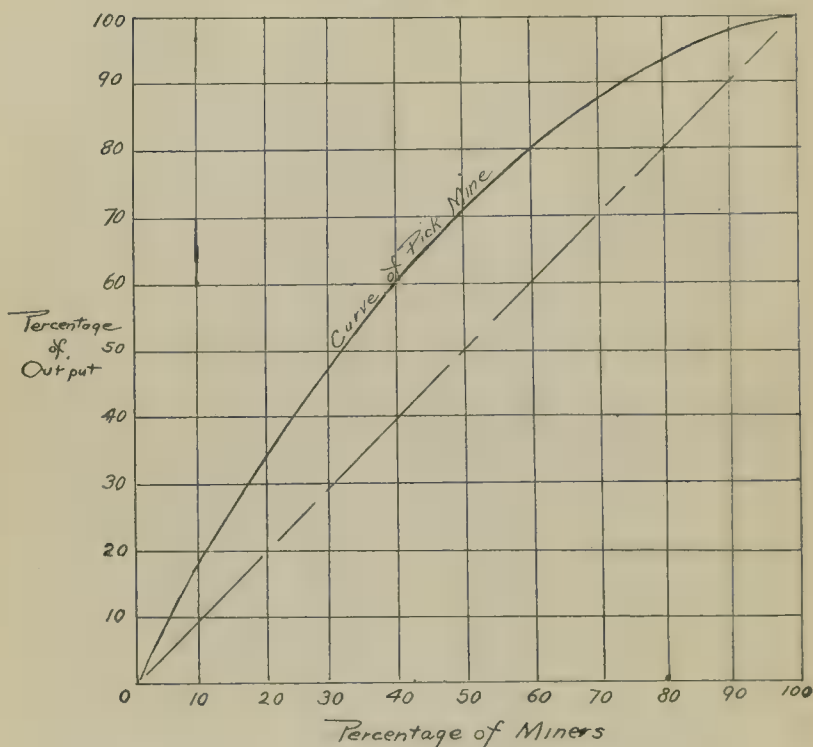
RELATION OF PERCENTAGES OF TOTAL NUMBER OF MEN TO PERCENTAGES OF TOTAL PRODUCTION FOR A MINE OPERATING UNDER THE EQUAL TURN CLAUSE DURING 12 DAYS OF WORK.

Classification by 1,000 of Pounds	Number of Men	% of Total Number of Men	Cumulative Per Cents	Cwt.	% of Cwt.	Cumulative Per Cents
185	1	.57	.57	1,845	.77	.77
180						
175	1	.57	1.14	1,762	.73	1.50
170	3	1.70	2.84	5,161	2.14	3.64
165	4	2.27	5.11	6,665	2.76	6.40
160	10	5.62	10.73	16,264	6.75	13.15
155	20	11.36	22.09	31,477	13.05	26.20
150	16	9.09	31.18	24,366	10.10	36.30
145	25	14.20	45.38	37,048	15.36	51.66
140	29	16.48	61.86	41,437	17.18	68.84
135	19	10.81	72.67	26,194	10.86	79.70
130	8	4.55	77.22	10,561	4.39	84.09
125	8	4.55	81.77	10,217	4.23	88.32
120	4	2.27	84.04	4,910	2.03	90.35
115	4	2.27	86.31	4,726	1.96	92.31
110						
105	3	1.70	88.01	3,224	1.33	93.64
100	4	2.27	90.28	4,101	1.70	95.34
95	2	1.14	91.42	1,955	.81	96.15
90	1	.57	91.99	916	.38	96.53
85	2	1.14	93.13	1,760	.73	97.26
80	1	.57	93.70	844	.35	97.61
75						
70	3	1.70	95.40	2,177	.90	96.51
65	1	.57	95.97	683	.20	98.80
60	1	.57	96.54	649	.27	99.07
55						
50	1	.57	97.11	523	.22	99.29
45	1	.57	97.68	496	.20	99.49
40	1	.57	98.25	417	.17	99.66
35	1	.57	98.82	392	.16	99.82
30						
25	1	.57	99.39	267	.11	99.93
20						
15	1	.57	99.96	154	.06	99.99
Total	176			241,242		

No one will claim that any two men are equal or that when left to themselves they will do equal amounts of work. One of the troubles of mine management under the customary room and



PLATE I



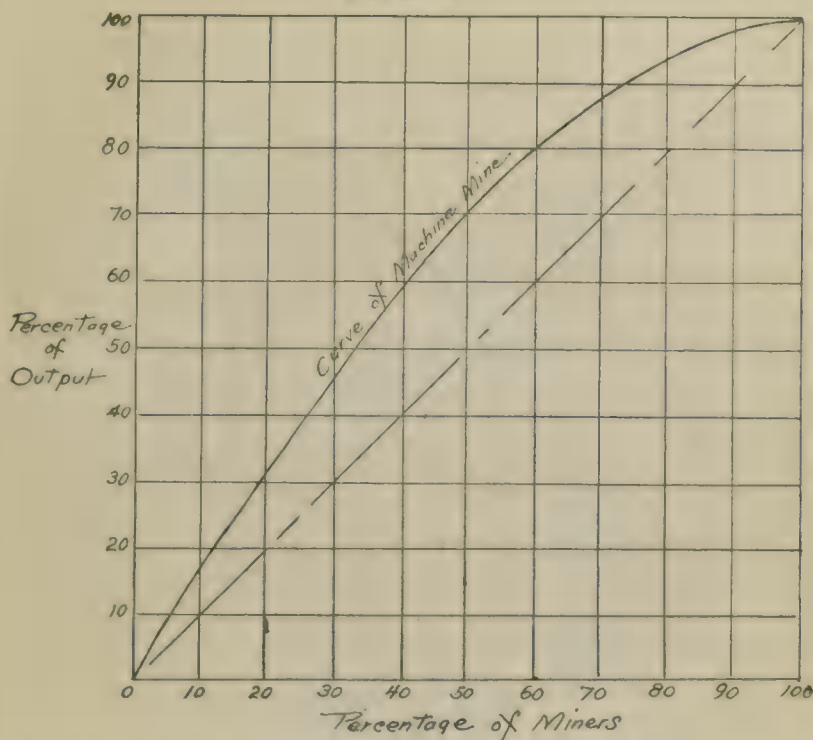
Curve showing relation between percentage of output and percentage of miners at a pick mine for 14 days of work.

pillar method of mining is that for orderly work this method requires an even alignment of men equal to a company in formation in the army, and then such little supervision is possible that the work breaks into the irregularity of a skirmish line under fire without officers or N.C.Os.

In order to show how the average tons per miner breaks up when one examines the work of a mine, four tabulations from different mines are given here. One exemplifies a place where the work was pick mining; the second, machine mining; the third a mixed pick and machine mine; and the fourth a machine mine operating under the rule requiring that the men be given an equal turn of cars. In all the mines the height of the seam of coal was about equal. With the tabulations as a basis curves have been plotted.

One two-weeks period only is covered by each of these tabu-

## PLATE II

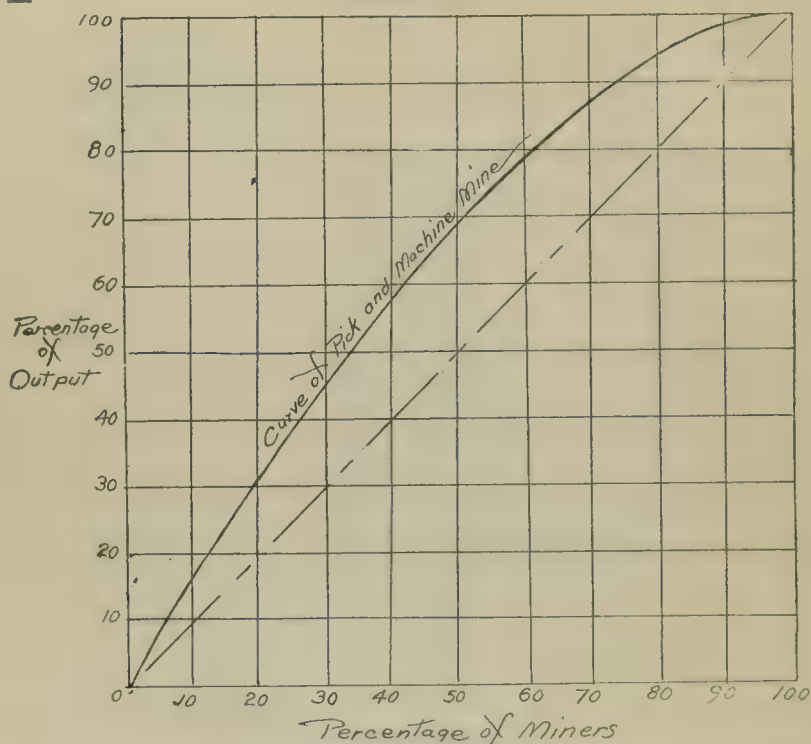


Curve showing relation between percentage of output and percentage of miners at a machine mine for 14 days of work.

lations, and except for the first two, they do not cover the same two weeks. They are all however, for a full two weeks without broken time and are for periods when the demand for coal was good and best efforts were being made to mine large quantities. The original figures were derived from knowledge of the amount of coal credited to each miner. The figures are not taken from chosen mines but are merely figures which happened by chance to come to hand.

In making the tabulations the weights of coal were recorded in hundreds of pounds and the figuring consisted in classification of the men according as the amounts fell between divisions of ten thousands of pounds. For instance, the man with the largest output to his credit for fourteen days of work at the pick mine, had 321,800 pounds and so one man was placed in the class 320. The next highest man was found to have 304,100 and so no man

PLATE III



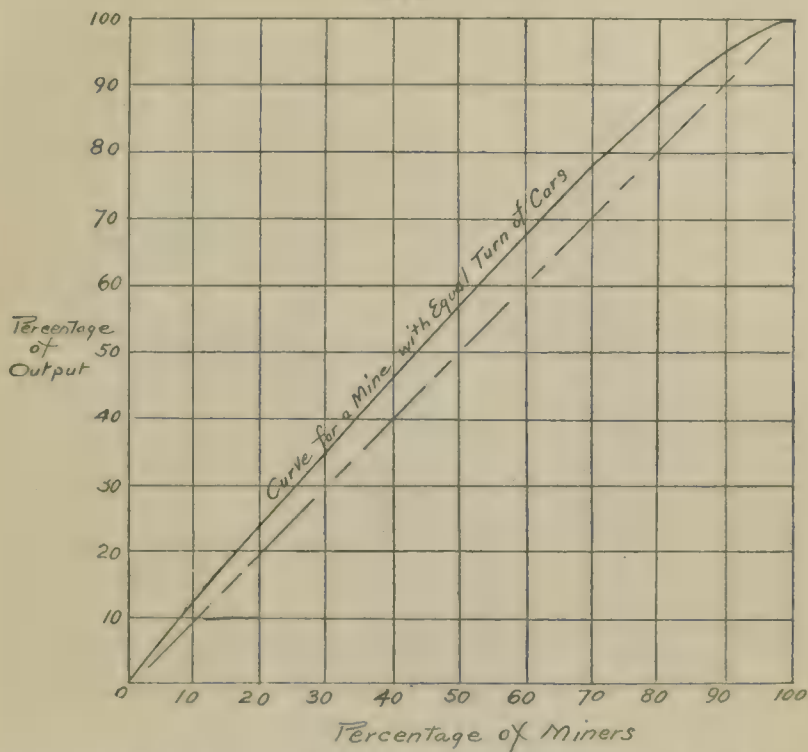
Curve showing relation between percentage of output and percentage of miners for a pick and machine mine.

was put in the class 310 and one man in the class 300.

Having classified the men and counted up the number in each class, the number of pounds from each miner in each class was next added up, so as to get the totals from the classes.

The purpose of this was to calculate the percentage of the total in each class, both of number of miners employed and number of pounds for each class. Then having the respective percentages, they were added progressively from the highest to the lowest so as to determine what percentage of the tonnage was obtained from what percentage of the men. The classification and calculations are given together with the curves which were plotted from them. From the calculations for the pick mine it will be seen that 23.66 per cent of the miners mined 38.5 per cent of the coal and that 48.66 per cent of the miners mined 69.1 per

PLATE IV



Curve showing relation between percentage of miners at a mine operating an equal turn of cars—12 days of work.

cent of the coal. Or instead, taking the figures from the plotted curve so as to get even percentages, it will be seen that:

25	%	of the miners	mined	41.0	%	of the output
50	"	"	"	70.0	"	"
75	"	"	"	91.0	"	"
100	"	"	"	100.0	"	"

Stating this differently so as to show the differences in results obtained from men:

The	first	25	%	of the miners	mined	41	%	of the output
"	second	"	"	"	"	29	"	"
"	third	"	"	"	"	21	"	"
"	fourth	"	"	"	"	9	"	"

These figures deserve modifying explanation. No reckoning is here made of any difference in the number of days which the

PLATE V

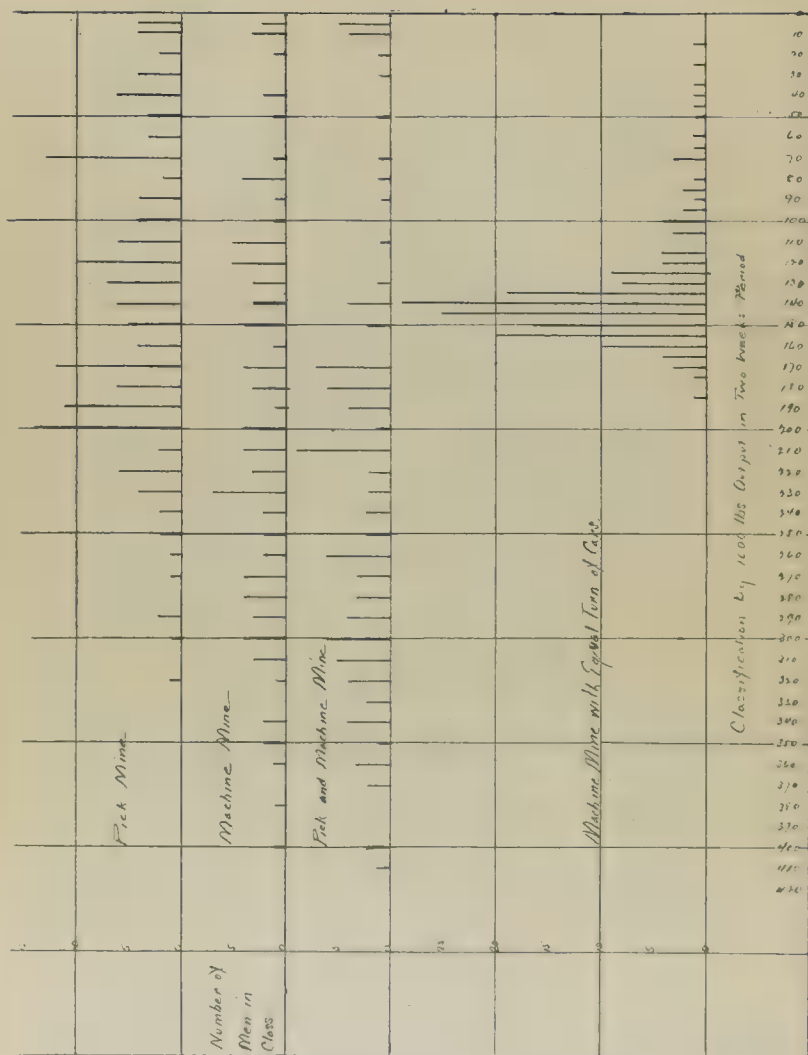


Diagram to show the comparison between the outputs obtained from the miners in four mines.

miners worked. The men who only sent out of the mine three, four, and five tons and probably only worked one day, are counted as one man. These men will fall into the last 25 per



cent of the men who only mined 9 per cent of the output. The total result obtained is the thing to be known.

Labor turnover at a mine is often excessive and one has to count out the results from the last quarter of the men as the result of the accessions to the force and also those who became dissatisfied and quit.

If one compares the results obtained at all four mines, one gets a tabulation such as follows:

Percentage of Miners	Percentage of Output			
	[Character of Mining]			
	Pick	Machine	Pick and Machine	Equal Turn
First 25 .....	41.0	40.0	38.5	30.0
Second 25 .....	29.0	30.5	30.5	26.5
Third 25 .....	21.0	20.5	22.0	25.0
Last 25 .....	9.0	9.0	9.0	18.5

In the first three mines one finds a similarity in results. In the last there is a contrast to the other three and one has a suspicion that in this latter there is not so high a labor turnover as in the other, particularly when one notices in the tabulations how few men sent out a small amount of coal.

But the thing to note is that only one quarter of the men are producing any where near a full amount of coal. Doubtless the other three-quarters suffer from unemployment within employment and are dissatisfied in consequence. Moreover, when only 9 per cent of the output is obtained from 25 per cent of the men, one can logically ask the question, why add this number to the payroll. Effort spent upon the other men would make up the loss from this last quarter.

As to the amount of work a man can do, one also finds that in the pick mine the best man mined and loaded 321,800 pounds of coal in fourteen days or a matter of 22,968 pounds a day, equivalent to 11.5 short tons. At the machine mine we find the best man who had only loading to do, doing better than fourteen tons a day and the first quarter of the men averaging slightly better than eleven tons. In the last mine the best man loaded only slightly over one-half of what the best man at the machine

mine loaded. Here one finds the best men held back and the poorest boosted.

It is aside from the argument but worth inserting here, that when the amounts earned by the men at the first two mines were investigated, it was found that at the machine mine during this period of full work, almost 5 per cent of the loaders received more than the superintendent and 28 per cent more than the mine foreman. Loading after machines is about as simple work as there is in the mines and is the class of work which is done by the illiterate emigrants from Europe. It is not an encouragement to any man to take the responsibilities of supervising work, when workers are likely to earn as much or more money than either foreman or superintendent.

## CHAPTER VI

# THE RECORD OF COMPLAINTS IN ILLINOIS

The fullest *detailed* record of grievances of the men in the mines is to be found in Illinois where a union contract between the operators and the miners for the past twenty years has established adjustment machinery. For the past dozen years a record has been published by the Illinois Coal Operators Association of cases referred to the commissioner for the operators and the executive board member of the union and in case of disagreement from them to the Joint Group Board. There are over six thousand five hundred recorded cases, of the individual grievances of the miners, not settled at the mine.

The records of these appealed cases for the months of January and July of 1919, 1918, and 1917,<sup>1</sup> have been tabulated to show whereabouts the grievances lie in the work of a mine and their definite character. It is a sampling of the grievances; not a thorough quantitative analysis. January was chosen as a month of full work; July as a month of slack work.

The analysis shows two hundred and forty-two cases under the classification of compensation as against two hundred and eight other cases. Of these compensation cases, four sub-classifications concern "miners" and one the "company men."<sup>2</sup> Miners are from two-thirds to three-quarters of the men underground and are piece workers; company men, one-third to one-quarter and day workers.

Under the classification of compensation we find two hundred and six cases where miners made complaint as against thirty-six where company men made complaint; almost six times as many complaints from miners as from company men.

<sup>1</sup> The Illinois Coal Operators Association. Monthly Bulletin. 1917, 1918, 1919.

<sup>2</sup> Using the technical language of mining, the producers are the "miners"; those who do the other work of the mine, the non producers, are the "company men."

This corresponds with testimony from other sources, that the "company men don't have any grievances"—and with the generally known fact that the strength of the membership of the United Mine Workers lies among the miners, not alone because they are numerically stronger than company men but because they have more grievances in proportion.

*Compensation*  
*Grievances of "Company Men"*

Taking up the questions of compensation in detail, the sub-classification of underpaid rate applies to company men. It covers those cases where the question is one of the application of the union rate to a certain job. There are thirty-six of these cases. Twenty of them occur in January, the month of greater amount of work and sixteen in July. That is only what might be expected.

Case No. 5750, File No. 1267, may be taken as an example of a case of underpaid rates. In a broad way it is not peculiar to mining. It may occur in any industry—complaint of the rate of pay for certain work. It may be explained that in the mines doors five feet high and nine feet long are hung across the haulage ways in order to force the air to take a course through the places where the men are working. A boy will be given the job of tending this door, opening it to let cars pass through and closing it afterward. In the slang of the mines this is known as trapping.

CASE 5750. FILE 1267  
ENTERED JANUARY 25, 1919

A young man who has been trapping two doors, throwing three switches and attending to the signals when the motors go in at night, has been paid \$3.24 per shift. The miners claim a man is doing similar work on the day shift for \$4.75 and ask that this young man be paid the \$4.75 rate for the time he has been at work.

It was taken up at the mine January 29th by Commissioner Cahill, and Board Member Hutton and agreed:

"As this is mechanical haulage and as the man throwing switches on the day shift gets the \$4.75 rate this in our opinion fixes the trappers' rate under Section 10 of the State Agreement."

"We therefore agree Lindsey shall be made up to the \$4.75 for the time he has been doing this work and also be paid the \$4.75 rate as long as he continues at this class of work."

*Grievances of Miners*

When we come to the other sub-classifications we reach things peculiar to underground work. Openings (tunnels) are driven different widths in a mine. Those whose purpose is to give access to the coal and which are used as traveling ways are driven narrow because small openings stay open longer. As less coal is mined from these openings and as more skill is required in driving them, it is customary to pay extra for the work at so much a yard of opening driven, or yardage. Yardage is also paid on "crosscuts" between working places, because of extra work in that the coal has to be turned over a couple of times before it can be loaded into the mine cars. Case 4904, File 1073, is a case in point.

CASE 4904. FILE 1073  
ENTERED JANUARY 16, 1918

Two miners working in rooms one and two on the fifth west southeast were ordered to drive a crosscut between the rooms. The machine men were unable to cut the place more than fifteen or sixteen feet wide on account of the timbers. The management did not inspect these places from the time the men were ordered to drive the crosscuts until after it was completed, and the miners asked pay for yardage.

It was taken up at the mine January 28th by Commissioner McArtor and Assistant Board Member Rich and agreed:

"That as it is shown that it was impossible to cut this crosscut any wider than it was cut and these men were ordered to drive the crosscut under those conditions that the demands are sustained; the place to be measured and paid for at the price provided for in the sub-district agreement relative to width."

Case 4906. File 1073 is also typical.

CASE 4906. FILE 1073  
ENTERED JANUARY 17, 1918

Two miners were instructed to start room seven on the sixth west southeast and drive it ten feet wide. The top was so bad that it was necessary to timber up the face after the place was shot and before cutting again. On account of this timber the machine men were not able to widen the place out and it was stopped after being driven this width for six machine cuts. The mine manager was in the place several times but did not order the place widened and the miners asked pay for yardage after the place was stopped.

"It was taken up at the mine January 28th by Commissioner McArtor and Assistant Board Member Rich and agreed that these miners were entitled to yardage on the place."

Notice in these cases the infrequency with which the man in charge of the mine visits the working place and the looseness of the ordering of work, so that men have to work according to their best judgment. In the first case there was no visiting of the working place during several days. It has been commented upon previously how little time a mine foreman can give to each place and how much there is to see.

*Unemployment Within Employment  
Lost Time*

Under the sub-classification of lost time we find the greatest number of grievances of any one class. There are a total of one hundred and two out of the two hundred and six pertaining to the miners, almost a half. It is the measure of the unemployment within employment and is almost a quarter of all the grievances.

Case No. 5712, File 1017, is quoted here to show the story of how one man lost time.

CASE 5712. FILE 1017  
ENTERED JANUARY 2, 1919

In pulling a car from a miner's place it ran off the points of the track and was not replaced and the miner's shots were not fired. (By the shot firer as the blast might injure the mine car.) He later demanded pay for one day and to be reimbursed for five feet of powder lost in the shots.

It was taken up at the mine January 6th by Commissioner McArtor and Sub-District President Sneed and disposed of as follows:

"The evidence in this case shows that the driver in pulling a car out of Mr. Williams's place got it off the track some time during the day. The shots were not fired because of the car being in the way. The following morning the assistant had the tracklayer put it on the track. Because of the shots not being fired Mr. Williams had no coal and consequently he lost one day.

"We agree that Mr. Williams will be paid one day's compensation and for the powder lost because the company in having the car put on the track the following morning assumed responsibility for same being off the track. This settlement has no bearing on the question of responsibility for the proper laying of temporary track by the miner."

Case No. 5722, File 1203, January 1919, is another. Notice that out of three days' possible work, the miner got only one-half a day's pay, and that the mine foreman is not expected to know when a man cannot work until the man himself gives him



the information, even though the fact is written down in the report books of the mine.

CASE 5722. FILE 1203  
ENTERED JANUARY 7, 1919

A driver got a car off in a miner's place and his shots were not fired. The place was reported on the books but the shots were not fired for two days and during this time the miner was idle. The morning the miner returned to work the car was replaced on the track and the miner remained in his place all day without reporting to the mine manager that he had no coal. The following day the miner and the pit committee went to the mine manager and asked that this man be allowed compensation for one day.

It was taken up at the mine January 11th by Commissioner Cahill and Sub-District President McAllister and agreed:

"As Piclish went into his place and remained there all day without notifying the mine manager that his shots were not fired and that he had no coal and did not ask for shift work, we are of the opinion he is not entitled to the day he claims. However, Piclish had the hole to drill out and retamp and was out the loss of some powder. We, therefore, agree to allow Piclish one-half day's compensation, this amount to reimburse him for the powder lost and the time of drilling and retamping his hole."

In this case the miner had to go into his working place, a matter of some time at least, fifteen minutes or half an hour, before he learned whether he could work and then go hunting the boss, who might have started on his rounds and be hard to find. And though he stayed idly in his place all day, no one came to put him to work. This man was a piece worker and his idleness for a couple of days, cost the company only half a day's pay; an avoidable cost.

There is another case where piece workers lost time, piece workers on whom other piece workers were dependent for a good part of their opportunity to work, machine runners cutting coal for loaders. Here is idleness of machine as well as idleness of men.

CASE 3864. FILE 1082  
ENTERED JANUARY 3, 1917

Two machine men demanded two hours' compensation each alleging they lost time while waiting for machine oil. The company sent a man in with oil early in the morning and later when advised by the machine men that they had not received the oil, a second man was sent in and they both reached the place about the same time.

It was taken up at the mine, January 4th, by Commissioner Davis and Board Member Syers and they agreed to drop the case as the evidence showed that the company did all that could reasonably be done to supply the men with oil.

This applies to men operating machinery and though the decision states, "that the company did all that could reasonably be done," one accustomed to better ordering of work might not consider it so. But those in mining have become so accustomed to such things that they accept it as if it were a necessary part. In fact at times, in reading over the record of cases settled in Illinois, one can find decisions which seem to lean partially toward the company management, yet acknowledging that the basis of a grievance exists. So three cases in succession: 5362; 5363; 5364.<sup>1</sup>

CASE 5362. FILE 1246  
ENTERED JULY 16, 1918

A miner working in a gang asked pay for one day when the machine his gang was using broke down. He was not given company work.

"We agree to drop the claim for compensation in this case and we recommend that in the future good judgment be used and when men are thrown idle from their regular working places that the company give them company work when possible or furnish them with other places."

CASE 5363. FILE 1246  
ENTERED JULY 16, 1918

Two loaders asked pay for one day each on account of being out of coal when the machine was out of order.

"We agree to drop the claim for compensation as the company was doing everything possible to have the machine repaired and there were three of the machines needing repairs at the same time."

CASE 5364. FILE 1246  
ENTERED JULY 17, 1918

Two miners asked pay for five hours each, because they were not notified that the mine had quit hoisting coal, in accordance with provisions of Section 22 of their local agreement.

"We agree that under Section 22 of the local agreement it is the duty of the mine manager to notify the men within one hour after the mine has quit hoisting and we agree that this was not done in this case and that Campian was not notified until 2:20 p.m., and we further agree to allow them two and one-half hours' compensation each on account of the mine manager failing to

<sup>1</sup> In quoting these, the paragraphs giving dates of settlement are omitted.

notify them according to the provisions of the local agreement, and in the future we recommend that complaints should be filed as early as possible so that an investigation can be made to fix the responsibility as to why the men were not notified."

In the first of these cases we find the moderate expression, "We recommend that in the future good judgment be used." A quiet damnation of the way that mine is managed. In the second case we find three important machines out of order at the same time—an excuse for throwing men idle. In the third, we find an example of the isolation of work within a mine where men can go on attempting to work though the mine as an organization has ceased work,—an example of the passing over of details (to the injury of men) in the managing of a mine.

### *Faulty Place*

Coal does not always run evenly; it does not always maintain the same height. The bottom underlying the coal may swell up and make a bump. Or a streak of clay may cut out the coal entirely. Or the coal itself may become full of dirt and so be unsalable. All of these conditions lessen the amount of coal which can be won in a working place, and as the miners earn mainly by loading coal into mine cars, a "faulty place" means less earnings. It has been, and is still in some places, a custom that the individual miner should take the hazard of encountering a fault and the miners have had to struggle to get payments written into union contracts. The purpose is to get the miner to work through the fault quickly and get into good coal where he can earn money again. If paid by the hour when in a fault, as there is no continuous supervision, the individual could loaf and still draw pay. Payments for faults could be standardized but they are often left to the judgment of the mine foreman. And they can produce many arguments and much accusation of partiality, one man often being paid more than another.

In case No. 4408, File 1142, July, 1917, the "roll" for which pay is requested is the same as a fault,—it is a ground condition.

CASE 4408. FILE 1142  
ENTERED JULY 18, 1917

Two loaders asked compensation for going through a roll which they claimed materially decreased their earning power.

"That on account of the change of mine managers since the time the work was done and the claim for compensation was made and from the evidence presented, we are of the opinion

there was a roll in this place and we agree that the question of compensation for going through the roll be settled locally."

Note the characteristic of mining, that no record of conditions encountered had been kept, to enable any succeeding man to tell what actually happened or how any bit of work was done.

### *Miscellaneous Compensation*

Under miscellaneous have been grouped requests for payment for tools lost by the miners when a part of the mine caves in and payments for falls of rock in the miner's working place and for other difficulties which miners encounter and sometimes get paid for. It needs to be understood that the miner owns his own tools, his shovel, his pick, his drill, and buys his own powder. So that when they are lost for any reason, he is out that much money.

CASE 5336. FILE 1147  
ENTERED JULY 4, 1918

Two loaders asked pay for tools lost under a fall in their working place. They claimed they were not able to locate a safe place for their tools.

"As this seems to be purely a local fall in the crosscut between rooms No. 6 and No. 7, as well as a local fall in room No. 6, which covered up the tools, and there is no contract provision governing payment for tools lost in this manner, we agree this case be dropped. But we recommend to the company that when they head room No. 6 off they make a thorough search for the tools and regain them if possible."

### *Interesting Feature*

Now there is one interesting feature in the number of these grievances of the miners, the contrast between January, ordinarily a month of full work, and July, a month of slack work. Under yardage this sampling of the grievances shows practically the same number in both months—eighteen in January and seventeen in July. It might be expected that in the month of most work there would be the most argument over payments. But then, look at the other classifications affecting miners. Under lost time there are forty-five demands for payments in January and fifty-seven in July; under faulty place ten in January and twenty-six in July (remember more faults are encountered in January because more mining is done); under miscellaneous, eleven in January and twenty-one in July; or a total for these three sub-classifications of sixty-six in January and

one hundred and four in July. July having a 50 per cent increase over January.

Although this analysis covers the war period when coal production was high, July 1918 particularly so, one is tempted to give a simple explanation for the increase in the number of cases in the summer. During January the miners can earn money by work on coal. During July, when work is slack, there is more compulsion upon the miners to increase their pay and so they make demands for pay for those things which under the general custom of mining they are not paid for. The price of a ton of coal is fixed over too large an area for the individual man to affect it. But he can affect those things which occur in his working place, applying to him individually. Now it can be assumed that under this union contract where pay can be demanded for lost time and faulty place, etc., that the management of the mines has reduced them to a minimum. Imagination only can measure what is happening in the non-union mines, where there is no compulsion to correct these conditions.

#### *Other Cases*

When we examine the two hundred and eight other grievances which have been tabulated, we find a great variety of things which divide themselves into three practically equal parts. There are sixty-nine cases of men wanting to be reinstated in their job. Of these the cases of those who refused to do as told or did poor work for which they were fired, are the most numerous,—thirty in all. Out of those thirty cases, the action of the officials of the company was sustained nine times. In some cases a compromise decision was rendered. In eleven cases, where some fault was found with the workman, the man was reinstated without any pay for lost time. And in only three cases was a man reinstated with pay; cases where company officials were found to be entirely in the wrong.

There is nothing distinctive in this except that in only 30 per cent of the cases was the mine management found to be correct in the exercise of their right to fire.

In the cases where an argument occurred between a workman and a boss, with counter charges from both sides, we find a fifty-fifty split. In half the cases the workman was sustained and in half the boss. Of course without the right of appeal to outside judges, the 50 per cent of cases where the workman was



correct would have been lost as the mine official, being judge and jury, would have fired him out of a job.

In the transfer from one job to another we find the mine officials supported four to one.

In the requests for reinstatement after absence of which there are only eighteen cases, we find that twelve of these occurred in January. It is only what those who have been in charge of mines are accustomed to. For there are some workmen at each mine who in the spring of the year go away to work out in the open air while it is warmer and then when cold weather comes again, return to the mines where it is relatively warmer. There are only eighteen cases of reinstatement after absence out of the total of four hundred and fifty cases and only part of these apply to seasonal workers.

### *Working Conditions*

Under the classification of working conditions we find a greater number during January than during July; thirty-seven against twenty-four. This is only to be expected as the more work, the more instances of poor working conditions. The total number is only  $13\frac{1}{2}$  per cent of the total number of grievances.

The first group under working conditions is the equal opportunity to earn. It is easier to deliver mine cars to the miners working along certain roads in the mines and unless a special effort is made, often certain men will be getting more cars than others and so earning more. This is important to the miner because he is paid by the ton which he loads into mine cars.

CASE 4893. FILE 1251  
ENTERED JANUARY 1918

From the time operations were started until a short time ago the men have had an unlimited turn at this mine. The miners now ask that the turn be kept as provided in Section 28 of the State Agreement.

It was taken up at the mine January 3rd by Commissioner McArtor and Board Member Trout and agreed:

"That from the evidence it has not been deemed necessary to keep a turn board and mark up the turn as provided for in Section 28 of the State Agreement because the turn has been unlimited, it now appears that such is the case no longer.

"We therefore, agree that beginning January 16th the turn will be kept as provided for in Section 28 of the State Agreement."



*Not Sufficient Work*

Under this grouping come complaints which are more important to the miners (and to the company) than anyone apparently realizes. It is a question of the balance of work between divisions of labor. For instance, case 4875, File 1229 January 1918.

CASE 4875. FILE 1229  
ENTERED JANUARY 4, 1918

The miners claim that the company had sixteen men following one of the machines and that this was in violation of an agreement made by the joint board to the effect that the company would have but fourteen men after each machine. The representatives of the company stated that two extra loaders were only put on for the purpose of finishing two rooms which were being worked out.

It was taken up at the mine January 3rd and in Benton January 7th by Commissioner Cahill and Assistant Board Member Rich and disposed of as follows:

"We agree the company is only entitled to fourteen loaders under decision of joint group board No. 3 and they should not put on any more loaders unless it is mutually agreeable to all concerned."

The importance of this is that the mining machine does (technically) the mining of the coal. It undercuts the coal so that, after blasting, the coal is loosened from the solid and ready to be loaded into mine cars (by hand) by the loaders. And if the machine runners do not get enough coal "mined," there will not be enough coal for the loaders following to earn their wages; there will be no opportunity for the loaders to work.

*Possession of Job*

CASE 3888. FILE 1246  
ENTERED JANUARY 1917

A car repairer claimed that he should have been given a place as blacksmith alleging he worked several days as blacksmith during September. The company needed an additional man and they put on the man who had been serving as blacksmith's helper.

It was taken up at the mine, January 12th, by Commissioner Burns and Acting Board Member Pierpont and agreed that as the company had the right to direct the working force they were within the rights in giving place to the helper.

Under this classification also we find a case which reads as if the mine manager knew how tactfully to cooperate with the local representatives of the union. It might be taken as a bit of participation of men in management.

CASE 4397. FILE 1142  
ENTERED JULY 12, 1917

Two machine men claimed what was known as the main north territory. It had been agreed by the mine manager that the question would be left to the pit committee for them to decide who was entitled to the territory. They rendered a decision in favor of Charles Hill but the agreement was never made effective because it was unsatisfactory to the other machine man.

It was taken up at the mine, July 18th, by Commissioner McArtor and Acting Board Member Sneed and agreed:

"That the agreement entered into between the mine manager and the mine committee giving the territory to Mr. Hill is binding on all parties and will stand as a settlement in this case."

#### *Miscellaneous*

CASE 5749. FILE 1267  
ENTERED JANUARY 1919

The miners claimed that from the time the mine was opened it was the custom to lay the track in the center of the room and that recently the company has changed the practice and now put the track about four and one-half feet from one rib. The miners object to this change.

It was taken up at the mine January 29th by Commissioner Cahill and Board Member Hutton and agreed:

"As both sides agree it has been very generally the custom to lay the track in the center we are of the opinion the company cannot at this time change the system. We, therefore, agree the company shall lay the track in the center of the room and if they think a change would be better for the mine they must take the question up under Section 13 of the State Agreement and try to get the desired change."

Changing the position of the track in a working place gives a grievance because a miner can throw coal about twelve feet with his shovel. If the room is twenty-four feet wide and the track is in the center, then he can load directly into the car from any point along the working face. But if the edge of the car is seven feet from one corner of the room and seventeen feet from the other corner, then the miner will have to turn over part of the coal before loading it into the mine car; that is, do double work on a part of the coal without any increase in rate of pay. This is an example of the need of engineering in underground work.

# RECORD OF COMPLAINTS

105

CASE 5723. FILE 1095  
ENTERED JANUARY 7, 1919

Under hand-mining conditions the rooms in this mine were 24 feet wide. Machines are being installed and the company asked the right to have the rooms driven 30 feet wide. When driven by hand rooms are turned off the entries on 32 foot centers and when the machines were installed rooms were marked off on 38 foot centers and the machine men refused to cut the places as marked and stated they were acting under instructions given at a meeting held by the miners.

It was taken up at the mine December 30th by Commissioner O'Connor and Board Member Mercer. No agreement was reached.

This is a contrasting case. Here increasing the width of the working place by six feet meant a part of the coal had to be "turned over" before loading was possible, thereby doubling part of the work without any increase in rate of pay. The idea of widening the room is that it would increase the amount of mining possible by machine in one place and the machine would be moved less frequently to undercut the same amount of coal: an advantage to the two men running the machine, which does not offset the disadvantage to the dozen or more men following the machine who have shoveling to do. It has been commented that rarely is mining laid out to the advantage of the individual man, but, as in this case, the width of rooms is determined by the roof conditions—how wide a place can be driven and have it stay open—rather than by the work which is to be done. Trying to make men fit mines, rather than mines fit men, of course creates grievances.

## *Starting Time*

CASE 4897. FILE 1259  
ENTERED JANUARY 14, 1918

The miners asked that the company agree to have three empty cars at the tippie before blowing the whistle for work. The company objected to making any agreement of this kind.

It was taken up at the mine January 22nd by Commissioner Cahill and Acting Board Member McAllister and agreed:

"As the car supply at all mines at times is very uncertain, and as there is no local agreement at any of the larger mines as to the number of cars to be placed at the tippie before starting, they going down at times without a car in sight, and get a full day's work, we believe it would be an injustice not only to the company, but would work a hardship on the miners at this mine. We therefore agree to drop the demand of the men for the three cars, but recommend to the company that they do all

in their power to notify the miners whenever they know for certain that they will not get any flats for the day."

This case ties in the inside grievances with those outside and beyond the control of the operator. The "car supply" is the railroad car supply. Coal brought out of the mine is dumped directly into the railroad cars, so that if there are no railroad cars—no "flats"—no mining can be done.

But notice the careless treatment of men which is exposed in the last sentence. "We recommend to the company that they do all in their power to notify the miners whenever they know for certain that they will not get any flats for the day."

It is customary at coal mines to blow the mine whistle a certain number of times at a certain hour in the evening if there is to be work on the next day. But often the railroad car supply is so uncertain that the mine management will not know on the evening before if there is to be work and the men listen for the whistle at five in the morning. This uncertainty may continue till starting time and may induce in the management a carelessness in letting the men know at the earliest moment, whether work is possible.

### *Fining*

The twentieth section of the agreement between the coal operators of Illinois and the United Mine Workers empowers the collection of fines from the miners for throwing a mine idle through a strike. By appeal through the regular channels the men can have these fines remitted. Fining can also be done for loading dirty coal by the miner.

It is of interest, though the number of cases is small—nine only—that the fining for dirty coal is twice as large in summer as in winter. What might not be expected is that the fines for suspensions of work together with the preferring of charges against union officials for exceeding their authority is twice as great in summer as in winter. Evidently the devil finds work for idle hands. One might expect to find that the more work there was, the more trouble there would be, but it does not seem to work out that way. It is an argument in favor of steady work as productive of contentment.

Case 4867 in connection with a matter of fines for not coming to work is interesting because of the scolding of both parties to the controversy which accompanies the decision. With that

solding written down in the record, neither side can make the incident a later basis for charges against the other. The rank outsider to coal mining may be particularly interested in the last sentence.

CASE 4867. FILE 1222  
ENTERED JANUARY 2, 1918

On the morning of December 11th the miners refused to change clothing in the wash house, and did not report for work. (It was December and the wet mining clothes from the day before would be frozen stiff in an open wash house.) Some of the men who did not use the wash house reported for work, but the company did not have enough men to operate the mine. A fine of \$3.00 was collected from each of the employees who failed to report for work.

It was taken up at the mine January 5th by Commissioner McArter and Board Member Willis and agreed:

"That after listening to all the evidence in this case and inspecting the wash house at this mine, we realize that it is possible and was probable that the wash house was too cold to be comfortable, and taking into consideration all of the facts surrounding this controversy, we agree that the fines assessed and collected as per Section 20 of the State Agreement, be refunded.

"We desire, however, to call attention of both the company and miners at this time to the fact that under present conditions this country has never experienced such a pressing need for coal and it should be the duty of each and every one connected with the mining industry to put forth every effort to produce the coal so much needed by the people and the government of the country. The company should put forth every effort in trying to arrange comfortable conditions in the wash house and the miners should be willing when such is done to put up with some uncomfortable conditions and thus keep the mine in operation and producing a maximum amount of coal that is at this time so much needed to successfully carry on the war, and keep people from suffering, which is now being caused because of a shortage of coal, partly brought about by conditions and feelings, such as seem to exist at this mine.

"We would recommend that the local officials and management get together and work out a set of rules satisfactory to all concerned to govern the management and use of the wash house, and in that way eliminate any feeling that might now exist, and in the future should conditions become unsatisfactory to either party keep the mine in operation even if some discomforts are experienced, and take up your differences in a sane and reasonable manner and thus protect the public who are the people most interested and least to blame."

Case 5342 is an example of fining for dirty coal, but the real point of the case is that it shows how little coordination the



management maintained between the two divisions of labor; the undercutting machine runners and the loaders after machines.

CASE 5342. FILE 1251  
ENTERED JULY 6, 1918

Several men were fined for loading out fire clay with machine cuttings. The machine men refused to throw the dust back and the loaders shot the coal down without removing it.

It was taken up at the mine July 10th by Commissioner McArtor and Sub-District President Sneed and disposed of as follows:

"We agree that where the machine men cut into the clay they will throw back the clay so cut by them, and where there is an abnormal condition such as a sudden rise in the place or where it is impossible to cut a place without cutting into the fire clay, they will have the right to take the matter up requesting pay for removing the impurities and it will be handled under Section 13 of the State Agreement the same as any other dispute.

"We agree also that as it appears from the evidence the loading of impurities, for which the men in this case were fined, was done more because of a controversy between the machine men and loaders than because of a desire to violate the agreement, and believing this agreement will eliminate further contention upon this matter the fines assessed on bug dust will be refunded."

The machine men to avoid cutting clay had extra work in manipulating their machine, for which they apparently got no extra pay—a matter of the miner taking the hazard of encountering a fault in the coal. And the loaders had extra work shoveling the cuttings—the "bug dust"—out of the way, with the result that they loaded it into a mine car and tried to get credit for so much coal. And the operator had dirt in the coal which he sent to market and may have had to give a rebate to the customer, who did not want to shovel dirt into the fire box under his boiler.

That a company under the union contract governing these disputes, has some come-back to overzealous pit committee men is shown in case 5385, where a company seeks to have union officials deposed. Although this case involving counter grievances resulted in a draw there are cases where the union officials were deposed. This case is also interesting as an example of the irritation to the management which the union can provide.

CASE 5385. FILE 1044  
ENTERED JULY 24, 1918

The company asked that the president and pit committee be deposed for failing to advise the top men to remain at work on the morning of June 14th. There was some objection to a man



employed by the company to weigh coal in railroad cars and the mine was idle from June 14th to June 27th, inclusive.

It was taken up at the mine July 23rd and in Springfield July 27th by Commissioner Burns and Board Member Sullivan and referred to the joint board.

DECIDED SEPTEMBER, 1918 (PAGE 443)

"That the operators shall withdraw their demand for the deposal of the president and pit committee and the miners will withdraw their claim for jurisdiction over Mr. Riva while he is employed as weighman to weigh the loaded railroad cars."

### *In General*

There are probably many companies in Illinois who rarely have a grievance which is contested to the point where it becomes written into these Monthly Bulletins of the Illinois Coal Operators Association. There may be companies who have none. But anyone who reads over one of these bulletins, will learn in what way the men in the mines are irritated and how the organization of the work creates grievances. Records of strikes and their causes can be found; not of those strikes which cover the field as a whole, but of the individual strikes at separate mines which cause lost time and which add their cost to the cost of coal. And in contrast to strikes one will find men attacking companies in the legal methods under the union contract by presenting as many as fifteen grievances in one month.

In general there seems to be a change in the character of the cases as one goes back over a number of years. It may be only an impression, but there seems to be an atmosphere of fight in the early years and an atmosphere of adjustment of differences in the later, as if the management and the men had learned certain lessons; that they could and could not do certain things. For instance,—one finds in the early years of the records of cases, one such as,

CASE 694. FILE 1095  
ENTERED DECEMBER 16, 1910

The president of the local and the superintendent were taking up some cases and a dispute arose as to the number of times a certain case had been considered. The local president said he would not make any trouble there, but would have it out the first time he met the superintendent up town. On December 10th, he assaulted the superintendent up town and was arrested, plead guilty and was placed under a peace bond. He was later discharged by the company and the miners demanded his reinstatement or the removal of the superintendent. It was considered at the mine December 15th by Special Agent Cahill and

Sub-District President Jarred. They agreed to reinstate this man and allow him compensation for three and one-half days at \$2.70 per day.

When one counts up the number of cases occurring in each quarter of the year, one finds that, during eleven years, the fourth quarter—September, October, November—leads five times and the third quarter—June, July, August—is a close second leading four times.

The fourth quarter is a time of part full work and part half time, while the third quarter is one of all slack time. It shows that more troubles arise from idle time and starting work after idle times, than from continuous work. The conclusion is evident.

## CHAPTER VII

# DISCOURAGEMENTS AND THE LACK OF THRIFT

The ready imputation is that miners are free to work as much as they choose and it is pointed out that the men do not spend a full day underground, a fact which nobody denies who has ever been in or around coal mines. But it is only natural that miners should go home early. A mine is not a pleasant place in which to loaf. The general temperature is about sixty degrees Fahrenheit. It is cool and damp in the mines as it is in a dark cellar. When a man gets only three and a half hours work scattered intermittently throughout the day, it is only normal that after loafing a while and not knowing whether he may expect any more work that day, he should get discouraged and take his dinner bucket and go home. If he gets half a chance on the morrow he can make it up. The majority report of the Bituminous Coal Commission of 1920 might well have expanded one of the "basic principles" which it accepted, namely "that seasonal idleness breeds unrest in any group of men and in any industry" to include the fact that daily and hourly idleness will breed unrest.

In view of the general imputation it is worth while quoting from this majority report;

"We realize that a certain proportion of time is lost by the miners voluntarily. At the same time, we find that the figures submitted by the operators do not afford a measure of the amount of time so lost by the miners, for the reason that these figures make no allowance for the turnover. In these tabulations every man who worked at a mine at any time during the month is counted on the same basis as one who was on the roll every day the mine was in operation, regardless of the fact that many miners may have obtained employment on the last day of the month or been discharged at the end of the first day or moved to another mine in the middle of the month or died some time during the period.

"A man who worked thirteen days out of a possible twenty-six at one mine and thirteen at another would be counted in

these figures as two men with an aggregate voluntary absenteeism of twenty-six days, or 50 per cent of the fifty-two working-days for the two mines.

"A further defect in these figures is that the number of days that a mine is in operation is not necessarily the number of days that all the miners on the payroll have an opportunity of employment. Parts of the mine may have been in bad condition or closed for repairs, or the coal in the working places may not have been loaded out, making it impossible to mine more coal until the place is cleared, or the places may not have been undercut, making it impossible to load coal until this was done. Loss of time caused by these conditions is properly chargeable to the industry rather than to the miners.

"But even after allowance has been made for all the factors entering into the problem a margin remains between the number of days that the miners actually work and the number when they have an opportunity to work. A fair interpretation of this margin is that an irregular industry breeds irregular habits among the workers. When the men are not accustomed to going to work regularly every morning the incentive for regularity becomes less potent and a certain amount of absenteeism inevitably results. This is the psychological factor of irregularity, and it may be expected that it will disappear in large measure as the industry becomes more stable."<sup>1</sup>

The demand of the mine workers which was arbitrated before the Bituminous Coal Commission "that a six hour work day, five days a week, be established" was one which appealed to the individual miner. It was an attempt to regularize the industry and get away from the conditions which breed irregular habits. For he knew that he never worked six hours a day nor averaged two hundred and sixty days in a year. He knew that two hundred and sixty days was from 10 to 20 per cent more days than he usually worked and that on the days when the mine would be in operation he could do in six hours as much work as usual. So for the individual miner if the number of days could be increased it would be an increase in work and so an increase in earnings. The trouble with granting the demand would be that the operators would immediately increase the amount of underground transportation, as it is only a fraction of the total cost of mining coal, and the original output would be obtained in the six hours, the number of days of operation remaining the same, because of lack of market for any increase in capacity to absorb the increased output.

*What the mine worker needs is the proper organization of work, both in the industry and in the individual mine. The*

<sup>1</sup> United States Bituminous Coal Commission, Majority and Minority Reports to the President. 1920. p. 44, 45.

*proper distribution of work is an engineering problem. It is vitally important to the worker for he cannot make his earnings unless he has a proper situation.*

The workers do not employ engineers. The employers do and the knowledge of the engineer is generally applied to technical processes,—to electrical engineering, to mechanical engineering, to chemical engineering,—to material matter. The worker needs the human engineering. The situation is cramping to the engineer and damning to the worker.

In organizing workers the leaders must appeal to the men on some basis which will obtain a response, such a response that the men will stick together and give the united body the strength which the individual lacks. That response comes from the basis of earnings. The workmen need money to live. To go beyond the matter of earnings to the organization of work and thus supply a larger opportunity to work and to earn, is to get into a field where the worker is untrained and of which he has no exact knowledge.

Men appreciate in a rough, unmeasured way things which are wrong in an organization and their reaction on their own work. But the men in the mines have not yet through their organizations taken upon themselves the responsibility which the employers have neglected and more or less placed on the workers, of measuring thoroughly the details of work and analyzing its organization as a whole so as to produce better conditions.

To obtain pay increases the men have relied upon the bargaining power which organization gives to them. They have been able at the present time to boost the rates to unheard of heights. If one considers only the time which it takes to mine and load a ton of coal, which is not over half an hour and often less, and then realizes that a miner will get paid \$1.28 (union rates in some sections) for this time, one can see that miners in the bituminous mines are being paid at a rate between \$2.50 and \$3.00 an hour, a higher rate per hour than a mine superintendent will be paid. The trouble comes from their having so few half hours of work. This is where the engineer should step in.

The man in the mines looks upon the engineer as a henchman of the employer and so regards him as an enemy. It is true that in laying out the extraction of coal the engineer has slighted the human work involved.

The engineer is in the same position as the mine worker. He earns his living by working for an employer. The influence of



the circumstances of his employment is to turn the ability of the engineer away from consideration of the worker and confine his attention to things upon which an employer desires advice; to power engineering.

There are not many engineers in coal mining. Many of those who use the title of mining engineer are only surveyors. One man writing of the subjects which exist for scientific investigation in coal, speaks of the need of raising coal mining engineering to the dignity of a profession. Mr. Van H. Manning, former Director of the United States Bureau of Mines, speaking before the American Institute of Mining and Metallurgical Engineers, said:

"More than fifty years have passed since schools for the training of mining engineers were first established in the United States, and in that period a great number of technically trained men have gone out to take their places in industry. Remembering that over two-thirds of the people employed in the mining industry are engaged in the mining of coal, it might be reasonable to assume that two-thirds of these technically trained engineers would be found in the coal mining industry; but we all know that is not the case. Except in the case of those few schools that, because of their geographical situation, have unusually close relations with the coal mining industry, it is the exception rather than the rule for the technically trained mining engineer to go into coal mining.

\* \* \*

"In my opinion, it will be necessary for the coal mining industry to make a definite attempt to draw into its ranks more trained engineers, who will attack its problems with the impartial and scientific method of thought that the engineer is trained to exhibit."<sup>1</sup>

It is easy to understand why there are few engineers when one sees the recommendation of the subcommittee of the American Institute of Mining and Metallurgical Engineers on better control of mining by greater employment of engineers which states:

"Finally, the compensation for engineers should be revised and salaries paid commensurate with the knowledge and experience required, *not as is often now the case below the earnings of the uneducated mine workers*; the position and authority granted essential to the maintenance of proper self respect necessary to keep educated and experienced men contented."

<sup>1</sup> Proceedings American Institute of Mining and Metallurgical Engineers. February 1920. Stabilization of Coal Industry—Problems of the Coal Industry.



*Underlying Philosophy*

There are philosophies which guide the work of those around the mines. One of these you can hear frequently from the foreman and petty bosses, who have the customary attitude toward a foreigner: "Oh let 'em work. It's good for 'em."

In a way such a philosophy is a self-protective one for the foreman. Supplies such as props and rails and ties are not accounted for carefully. A carload of props containing more than are needed will be sent into a working place and when the place is finished unused props will be lying around the room. A miner nearby may be out of props and need them badly and yet there may be delays in sending them to him, or there may be none on hand outside. The custom is for the miner to search through the rooms which are completed, until he finds the props he needs and then carry them to his place. The mine foreman with his large area to cover cannot follow work closely enough to chase after an individual car of props and so develops this bit of philosophy to reconcile himself to conditions. One miner may need rails and rails may be scarce so that he may swipe the rails out of the track belonging to another miner and cripple the opportunity to work of the second man. The mine foreman may smile and look with favor on the hustler.

The philosophy of "Oh let 'em work" is applied to the mine foremen in turn. In one mine employing about five hundred men the owner would not let the foreman have a "shanty"—an office—inside for fear he would sit down. The foreman had to make up his time books wherever he could. He had to work over his mine maps spread out on his knees. There was no place or set time when workmen would be able to find him so that he could direct work. The owner wanted to be sure that the foreman visited the men. He could not put enough trust in the foreman, to do his work willingly, to give him a place where he could sit down and think or plan. It is hard to plan out work and do mental arithmetic when one has to watch one's footing continually or duck one's head to avoid bumping it on a sharp edge of rock as one walks along a roadway in the mines.

There is another idea around mines which leads to trouble. It is the idea that output can be obtained in proportion to numbers of miners employed. Mr. Herbert Hoover has stated that there are one hundred thousand too many men employed in the coal mines. His words are: "This industry, considered as a

whole, is one of the worst functioning industries in the United States. It is equipped with capital, with machinery, plants and labor to a peak load at least 20 per cent above the average necessity. This peak load, therefore, involves the use of probably one hundred thousand men diverted from other productive industries."<sup>1</sup>

Mr. Hoover bases his estimate only on the fact of the equipment for a peak load; on the fact that the mines are equipped for the output of November and December and that during the rest of the year there is not enough demand for coal to keep the mines busy. His estimate does not reckon in the fact that even for November there may be an over-equipment in labor. Its basis is the amount of lost time in a year. It counts in only increasing the number of days of work and does not include increasing the output per miner per day.

This over-equipment of one hundred thousand men exists mostly among one class of workmen; among the piece workers—"the miners." The statement of Mr. Dawson Hall which has been quoted, gives the reason: "He (the operator) cannot afford to have a single day man idle, but he can afford to have idle several miners who are paid by the ton." In other words the operator cannot afford to employ *too many company men but he can afford to employ too many miners.*

The result is that in the unmeasured managing of a mine, when more output is wanted, miners will be given a job in any available working place without consideration as to amount of transportation available to supply them with a full opportunity to work. Miners will be given working places when the transportation is already fully employed.

The growth of this idea is natural. When a mine is small, as all mines were forty or fifty years ago, and all mines are in the beginning, the number of miners employed is small and the distances through which cars have to be moved are short. In such cases transportation is not burdened if a few more miners are added and yet the total output of the mine is proportionately increased. But as a mine gradually gets larger and breaks away from craft work, this does not hold and the more men there are employed, the greater is the effort to maintain the balance between the different men.

<sup>1</sup> Proceedings American Institute of Mining and Metallurgical Engineers. February, 1920. Stabilization of Bituminous Coal Industry—Need of Stabilization.

Out of the six hundred thousand around the mines Mr. Hoover has estimated the too many men employed as amounting to one hundred thousand. If greater tonnage per man was obtained as well as the increase in the number of days worked which Mr. Hoover was calculating upon, this figure could be doubled. Without changing the industry so as to increase the number of days in a year, Mr. Hoover's estimate still stands good. There are one hundred thousand too many men employed as the industry stands.

These are the result of wrong philosophies guiding the actions of the men in charge of mines.

### *Payment for Work*

The manner of payment for work in the mines is such as to discourage good work—often positively such as to encourage poor work.

The company men are day workers and get paid for the hours which the mine works. A driver getting out 420 cars in two weeks and walking ten miles a day under low roof to do it, will get no more pay than a driver getting out 230 cars in two weeks and with less traveling to do. A motorman getting out 88 cars will draw the same pay as one handling 271 cars in two weeks. The motorman handling 88 cars will get more pay than the driver handling 420. These are actual figures from one mine. The pay is fixed for the hours at work and the classification of the work not for the amount of work done during the hour.

So in the case of a driver supplying a miner with cars, there is no encouragement for him to hustle and get the cars to the men along his entry, when he knows that another driver on another entry has only half as much work. It is no encouragement to the driver that a motorman is having it easy and drawing more pay. It is positive discouragement.

The foreman in bossing the job, is bucking conditions which exert constant pressure against good work being done. He does not change the motor over to the road on which the mule is working because it means an expense which would show on his cost sheet. During slack times it might amount to enough to cause him trouble. He must take out the trolley wire from the road where it is hanging and hang it up in a new road. There will be holes in the roof to be drilled and the rails along the

entry must be bonded with copper bonds in order that they may carry the return current. Perhaps light-weight rails were all that were on hand when the entry was started and to use the motor these might have to be replaced with heavier rails, which perhaps are not on hand.

Moreover the foreman does not know if the next two weeks will be a time of full work or slack. If it is March he knows that a period of six months of slack time is ahead of him when he must be careful not to add any penny of expense. So he worries along as best he can, bucking conditions which are against him. A superintendent will not order things done for the very same reasons. All along the line it is discouragement.

Work could be equalized between drivers but it would require calculating for each driver the number of cars and the distance they were to be moved. And then the miners have been trained to irregular work through years of irregular conditions and a definite number of miners cannot be counted upon to come out to work. And anyway coal is mined only as it is sold and perhaps tomorrow there won't be any work, so what's the use!

Between miners, the payment for work is as unequal as it is between company men. The amount of work required to mine coal is rarely the same in every part of a mine. There is a shading difference. If the classification of the mining is "pick mining," the rate per ton of coal will be the same whether the mining is done in rooms where the solid coal actually has to be undercut or where the mining is in pillars which have been standing under pressure for some time and the coal can be dug out without any undercutting or any blasting, as fast as it can be shoveled into a car. The same rate per ton will be paid in a room twenty-four feet wide whether the mine track is placed in the center of the room so that the coal can be shoveled directly to the mine car from any point along the face of the room or whether the center of the track is placed five and a half feet from one side of the room and the nearest side of the car is seventeen feet from the farthest corner of the room in which case the coal from the last five feet along the face has to be turned over once before it can be loaded into the cars. And the same price per ton will be paid whether the room is twenty-four or thirty-six feet wide and whatever the arrangement of the track.

The same price per ton will be paid throughout a mine,

throughout a region, throughout a state. The union rate per ton is fairly constant throughout the whole United States. But the amount of work involved in mining a ton of coal is not constant throughout any one mine. No engineering work is done in fixing a price for mining. It has been a matter of bargaining and many inequalities in the reward for work exist.

In mines where the amount of dirt to be cleaned from the coal varies, there is always the difficulty for the foreman of getting clean coal. The rates paid for coal are always productive of more pay than other things which a miner is called upon to do, and though a miner may be paid for taking out a certain streak of slate or bony which occurs in the seam, the amount of money he can get for taking it out is never equal to the amount he could get for it, as coal.

Moreover as a practical matter, if a man is honest and gets a reputation for loading clean coal, the mine foreman is likely to give him a place where there is a lot of dirt in the seam. For if the foreman put a bad man in a bad place, he would have almost to live in that workman's place. So a foreman is likely to penalize the good workman by assigning him to a dirty place and ultimately make trouble for himself through discouraging a good workman.

For the workman it is bad policy to get too good a reputation. It is better to get caught loading dirty coal once in a while. He will not risk much on his pay.

In mines (or along entries in mines) where the cars are "running good" (where the miners can get a goodly supply) it is often difficult to get a man to take an entry place because more coal can be loaded from a room and coal pays more than other work such as entry yardage. But in mines where a man is only likely to get three or four cars in a day and has not a full day's work on coal, then an entry place is desired because of the yardage and extra earnings. The custom of the mine also may be that entry men get first call on the mine cars,—have an "unlimited turn." In this case an entry place is sought, particularly when the supply of cars is small.

In driving an entry there is no extra reward for the speed at which the place advances. The purpose of the entry is to open up territory so that men can be put to work. Instead the miner makes more from coal than he can on yardage, so his effort is always to drive his place wide and advance it slowly.

Standing timber to keep a place open does not reward a



miner as much as getting coal. If a room caves in, the miner does not lose anything. He gets another place. If the place is bad, then it is advantageous for him to have the place cave in so that it cannot be worked. He stands a chance of getting a better place. He will get no more for a ton of coal from a bad place than from a good place. It may take him twenty or twenty-five minutes to put up a "set of timber" (two uprights and a crossbar from one to the other next to the roof.) For this he may get 50 cents or 75 cents. In the same time he could load a car of coal and earn perhaps a dollar.

Not only will a miner receive no more money for a ton of coal from one place than from another, but there is no reward for the man who loads many tons as against the man who loads only a few, as the pay of each ton is the same. In fact it is often the reverse. There is hardly any place in a mine where such things as falls of rock do not occur, and things for which the miner can ask payment. When measuring day comes around, the man who has only a little coal to his credit will put up the plea, "Me no make no money," and the foreman will give him an extra allowance, charging it up to cleaning up a fall. The good beggar will often, time after time, get his earnings made up to a full day's pay.

Alongside the beggar may be working an energetic man who has loaded a quantity of coal and is not a good beggar. The foreman may not give him any extra pay for cleaning up falls of rock, reasoning that the man has already made wages by loading coal.

The foreman is so rarely around at the working places that he cannot be sure concerning many falls. The tricky workman can easily cause a couple of tons to fall from the roof and then ask pay for cleaning it up. If he gets it, it is an encouragement for those, who naturally would not do such a trick, to try it.

Most men are honest and there are many men in the mines who do work in their places for which they ask no pay; many who actually wish that the boss came around oftener so that he saw with his own eyes what work they were doing. It is these men who are likely to get slighted in paying for extras—for "dead work"—work which does not directly produce coal. They are quiet and it will take the foreman months before he knows them so that when they bashfully say on measuring day, "John, there was a bit of a fall back there, which we cleaned up," the foreman will promptly ask how long it took. "Well, I don't

know exactly; we did it between cars. Perhaps three hours." "All right, I will give you a shift for it."

The foreman will roughly, crudely try to reward the men. But it will take him months to know whom he can treat that way.

The men in the mines are separated so that when the foreman goes from place to place on measuring day, no man knows for what the other men are making requests for pay. And the liar can lie glibly about his work unafraid that any of his fellow-workmen will take him to task and tell the boss the truth.

Broad general features concerning the payment for work are shown in some figures given out on March 1, 1920, by the Bureau of Coal Economics of the National Coal Association, which is an association of coal operators. On that date this bureau issued a number of bulletins from many regions, particularly covering the central competitive field of this country. Three of them are reprinted on pages 121, 122, 123 verbatim, as Tables. The rest showed the same general features.

TABLE 10A.—AVERAGE DAILY AND MONTHLY EARNINGS OF MINE EMPLOYEES OF THREE BITUMINOUS MINES IN THE FREEPORT THICK VEIN DISTRICT OF PENNSYLVANIA FROM JANUARY TO OCTOBER 1919, BY OCCUPATIONS<sup>1</sup>

(The Number of Calendar Days Each Mine Loaded Coal is Taken as 100% Opportunity for Labor to Work)

Occupation	Average daily earnings of men working specified percentage of full opportunity				
	Less than 25 per cent	25 to 49 per cent	50 to 74 per cent	75 to 100 per cent	Working more days than mine loaded coal
Loaders .....	5.57	6.55	7.33	6.90	6.06
Machine Men .....	8.68	13.17	12.10	10.81	9.74
Inside Day Labor .....	4.99	5.23	5.37	5.31	5.44
Outside Day labor .....	2.86	4.45	4.41	4.66	4.92
Monthly Men .....	4.00	3.50	4.77	5.16	5.21
Occupation	Average monthly earnings of men working specified percentage of full opportunity				
	Less than 25 per cent	25 to 49 per cent	50 to 74 per cent	75 to 100 per cent	Working more days than mine loaded coal
Loaders .....	16.29	61.73	118.19	151.39	147.19
Machine Men .....	19.71	128.90	193.40	243.44	258.03
Inside Day Labor .....	17.17	49.73	84.39	121.16	147.26
Outside Day Labor .....	5.85	43.82	70.45	108.51	136.38
Monthly Men .....	16.00	28.00	74.67	105.80	154.25

<sup>1</sup> As reported by operators of 3 bituminous coal mines. National Coal Association, Bureau of Coal Economics. C. E. Leshner, Director.

## FOUR HOUR DAY IN COAL

TABLE 10B.—AVERAGE DAILY AND MONTHLY EARNINGS OF MINE EMPLOYEES OF 14 BITUMINOUS MINES IN THE PITTSBURGH THIN VEIN FIELD OF PENNSYLVANIA FROM JANUARY TO OCTOBER 1919, BY OCCUPATIONS<sup>1</sup>

(The number of calendar days each mine loaded coal is taken as 100% opportunity for labor to work)

Occupation	Average daily earnings of men working specified percentage of full opportunity				
	Less than 25 per cent	25 to 49 per cent	50 to 74 per cent	75 to 100 per cent	Working more days than mine loaded coal
Pick Miners .....	5.50	6.21	6.28	6.62	6.02
Loaders .....	4.50	4.90	5.25	5.76	5.90
Machine Men .....	5.03	5.24	6.51	7.27	6.60
Inside Day Labor .....	5.06	5.10	5.07	5.16	5.23
Outside Day Labor .....	4.32	4.36	4.33	4.43	4.83
Monthly Men .....	8.91	4.60	5.25	7.40	4.18
Machine Men & Loaders ....	5.38	7.44	7.09	7.68	7.08
Average monthly earnings of men working specified percentage of full opportunity					
Pick Miners .....	16.07	50.80	87.08	129.41	121.00
Loaders .....	13.26	39.58	74.97	111.67	120.18
Machine Men .....	12.67	43.94	84.66	149.63	128.73
Inside Day Labor .....	13.98	41.33	71.27	108.71	124.65
Outside Day Labor .....	12.24	33.92	62.71	95.67	115.97
Monthly Men .....	39.00	21.36	84.06	88.76	126.16
Machine Men & Loaders ....	23.33	85.43	112.92	171.33	157.50

<sup>1</sup> As reported by operators of 14 bituminous coal mines. National Coal Association, Bureau of Coal Economics. C. E. Leshner, Director.

They give the average earnings of mine labor by occupations for the ten months from January to October 1919. These earnings are divided into classes according to specified percentages of full opportunity to work which the men actually worked, full opportunity for labor to work being taken as the number of calendar days each mine loaded coal. The average monthly earnings for each specified per cent are also given. These earnings cover the work of several thousands of men.

It is important to call attention, especially in view of the complaint that men do not work when they have an opportunity to work, to the way that men are frequently practically penalized for coming out to work.

TABLE 10C.—AVERAGE DAILY AND MONTHLY EARNINGS OF MINE EMPLOYEES OF 37 BITUMINOUS COAL MINES IN THE FAIRMONT FIELD OF WEST VIRGINIA FROM JANUARY TO OCTOBER 1919, BY OCCUPATIONS<sup>1</sup>

(The number of calendar days each mine loaded coal is taken as 100 per cent opportunity for labor to work)

Occupation	Average daily earnings of men working specified percentage of full opportunity				
	Less than 25 per cent	25 to 49 per cent	50 to 74 per cent	75 to 100 per cent	Working more days than mine loaded coal
Pick Miners .....	4.99	5.48	5.95	6.82	6.44
Loaders .....	4.57	5.22	5.72	6.11	5.63
Machine Men .....	6.11	6.56	6.96	7.93	7.77
Inside Day Labor .....	4.67	4.69	4.82	4.83	4.95
Outside Day Labor .....	4.75	4.51	4.57	4.67	4.80
Monthly Men .....			4.18	5.42	4.34
Machine Men & Loaders ....	5.25	7.56	6.17	8.13	7.72

Average monthly earnings of men working specified percentage of full opportunity					
Pick Miners .....	12.70	40.35	79.63	120.14	106.37
Loaders .....	12.82	38.31	76.98	112.07	95.32
Machine Men .....	17.59	46.11	91.51	152.50	150.28
Inside Day Labor .....	9.92	34.45	65.90	96.80	106.31
Outside Day Labor .....	13.00	32.35	63.44	98.62	113.91
Monthly Men .....			55.57	127.42	120.42
Machine Men & Loaders ....	7.88	40.80	62.57	85.78	94.83

<sup>1</sup> As reported by operators of 37 bituminous coal mines. National Coal Association, Bureau of Coal Economics. C. E. Leshner, Director.

For instance in the Freeport Thick Vein District of Pennsylvania the loaders who worked from 50 to 74 per cent of the full opportunity earned \$7.33 per day, while those who worked more time, from 75 to 100 per cent earned only \$6.90, and those who worked on days when the mine was idle or over 100 per cent of full opportunity, earned even less per day, namely \$6.06. In other words, those loaders who only worked from one-half to three-quarters of full opportunity earned 21 per cent more per day than those who worked more than full time. In the matter of average total earnings per month for loaders, we find that those who worked from 75 to 100 per cent of full opportunity

actually received more money—\$4.20—than those who were called upon or were industrious enough to work on idle days.

The same thing is found in regard to machine men, their average daily earnings steadily decreasing from the high of \$13.17 for those who worked from 25 to 49 per cent of full opportunity, to \$9.74 for those who worked more days than the mine loaded coal. In other words a man who works less than half the time will receive 35 per cent more wages per day than one who works as much as he can. As for the monthly earnings for the machine men in the Freeport District, they increased steadily with more days of work. Notice here that of this group, those who are working only from 75 to 100 per cent of the time, and, as the average figures which were given before show, less than eight hours a day, are earning more than mine foremen in charge of the whole work of a mine. It will be recalled that both loaders and machine men are piece workers.

In the Pittsburgh Thin Vein Field pick miners show decreased daily and monthly earnings as between those who worked 75 to 100 per cent of full opportunity and those who worked also on days the mine was idle. And machine men in this district lost out as they did in the Freeport Thick Vein Field. Those who were both mining the coal by machine and then loading what they had mined and who are also piece workers, also lost out by working on idle days.

In the Fairmont Field of West Virginia the same facts are shown. Here pick miners lose 38 cents per day and \$13.77 a month by attending to work; loaders lose 48 cents a day and \$17.75 a month; and machine men 16 cents a day and \$2.22 a month. The reward for inside day labor to change from the 50 to 74 per cent class to the 75 to 100 per cent is one cent a day, —half the price of a newspaper.

Even when one gets outside of the production end of bituminous coal mining, one meets similar complaints to those which exist from underground work. Mr. George H. Cushing, Managing Director of the Wholesale Coal Association said in part before the American Economic Association in December 1920<sup>1</sup>:

"The sales representatives of coal mines have struggled along on an income which was even less than the bank employee. When I say that I realize that condemnation can go no further. The salesman employed by the operator soon learned that there

<sup>1</sup> The American Economic Review. March 1921. p. 89.



was no hope of a future in that direction; therefore, as quickly as opportunity or his finances would allow, he set up in business for himself."

It hardly needs argument that the cost of production of coal under the customary organization of mining is high. One cannot have men and machines working irregularly and intermittently and not have it high. Cost accounting is almost an unknown quantity. It is only at the present writing that one finds in the various coal publications a vigorous campaign for better cost accounting so that the losses of operation may be known and avoided.

It hardly needs argument either that the customary organization of the work of the mines is going to produce discontent among the workmen. One might marvel that there was not more trouble and wonder how any coal was produced. It makes one realize that men will pitch in and do good work even when conditions are far from right. An ideal of conditions such that the path of least resistance is to do good work, is only of recent development. It has taken hold in manufacturing with continuous periods of work, but it has not yet taken a general hold in coal mining where work is intermittent.

The need is for a knowledge of thrift in the use of labor. It is hard to drop that record of grievances from the Illinois coal mines and not worry the subject as a dog worries a bone. It is not a record published by mine workers and so to be suspected as partial toward the men, but is published by operators for operators and without comment upon the cases recorded. They are given with simplicity. Throughout them all is the very smell of the mines. One can find record of incidents where the deciding authorities complain of poor bookkeeping; of men carelessly being put to work when the men already employed have not sufficient work; where the only man with authority is the mine foreman with a large area to cover and where men trying to do their work, obeying the best orders they know, lose in the mine while their machine was being repaired. They alleged instance:

CASE 5355. FILE 1246.<sup>1</sup>  
ENTERED JULY 12, 1918

Two machine men asked pay for five hours each for waiting in doing so because minor officials have no authority. For

<sup>1</sup> The Illinois Coal Operators Association. Monthly Bulletin. Vol. X. No. 8. July 1918.

the machine boss told them to wait while repairs were being made and they waited until the mid-afternoon cage and were entitled to pay.

It was taken up at the mine May 31st and in Springfield July 17th by Commissioner Burns and Sub-District President Haywood and referred to the joint board. It was later referred to a committee composed of Messrs. Rice Miller and Edward Cahill for operators and Messrs. Mose Johnson and George L. Mercer for the miners. They met in Springfield July 24th and agreed:

"That these machine men be allowed five hours each, not because of the orders given them by the machine boss, for the agreement does not delegate this authority to him, but for the reason these men showed the proper spirit in remaining in the mine an unusual length of time, under the belief that the machine boss had the authority to pay them, but it is further understood that men will not be entitled to pay when waiting for a machine to be repaired unless they have taken the matter up with the proper management of the mine."

That record of arguments is a very human document. In it are contained stories of all the troubles which man falls heir to when he tries to manage a mine or goes to work in one. They have been written with genius. What shorter, more human story could be written than the following decision.<sup>1</sup>

"In view of the fact that the evidence shows that the improper language was used by Julian in the barber shop down town, not knowing that the mine manager was present, and that the evidence does not show that he intended to apply this language to the mine manager personally, that he be reinstated with compensation for time lost."

Not all the cases show just grievances of men. On the contrary many show a lack of understanding on the part of men, an over-demand on their part for things which are not just, or a lack of appreciation of what was the real cause of their situation and a demand for the wrong cure. There are many incidents of the irritation which men cause to management when they feel strong through membership in a union and through operation under a union contract; incidents of human arrogance, incidents where men failed to lend themselves to a thrifty use of labor.

There is a bit of humor in this last case which should be quoted. One can imagine the mine boss with his lamp in hand,

<sup>1</sup> The Illinois Coal Operators Association. Quarterly Bulletin. Vol. VII. No. 3. August 31, 1915.

standing on the bottom where cars are being rushed onto the cage to be hoisted up the shaft, up to his ears in work getting the day started in a pell mell fashion, and barking vigorously in sudden anger at men asking for something which might disrupt the work of the mine.

CASE 6251. FILE 1140<sup>1</sup>  
ENTERED JULY 29, 1918

A driver and a track-layer asked pay for one day each when they arrived at the mine too late to ride in on the man trip. They claimed they were late because the office was not opened until 7.40 and they were obliged to get carbide. When they reached the bottom and asked the mine manager if they were to be hauled in he told them to walk in or walk out.

It was taken up at the mine July 17th by Commissioner Burns and Sub-District President Haywood and they agreed to drop the claim for compensation for the reason they decided to go home rather than to walk in to their work.

<sup>1</sup> The Illinois Coal Operators Association. Monthly Bulletin. Vol. XI. No. 8. July 1919.



## CHAPTER VIII

# THE ENGINEERING NEED

But why?

What are the circumstances which have induced the customary organization or lack of organization of the underground work of the mines. What are the changes which have come over mining. What is it that has not changed so that one finds the same causes of trouble year after year.

Coal mining has a growth. In any region where coal exists in the ground it is a growth as an industry. One can take the simplest situation as an example and suppose, for instance, in a country that is just being settled, that a farmer finds coal outcropping on his land. He may mine it for his own use first, as it is preferable to wood as fuel, and then as others take up land around him, he may mine some for his neighbors. As the region becomes more populous and a town springs up near him, he may begin to sell house coal in the town. Then as means of transportation are developed for the convenience of the region, he begins to ship coal to points farther and farther away. As the region grows, the business of mining coal grows, until the original farmer instead of working in the mines when the summer work on the farm is finished, is employed more by the mine than by the farm and devotes most of the year to mining.

Coal, unlike metals, is never limited in area to one farm. It extends over regions. And so about the time that the original man has gotten well started and the demand for coal is growing, another man decides to open up a mine on his farm and put in a connection to the railroad and build a tippie.

The immediate result is that both men divide the number of days of work in a year. For coal is unlike other commodities. Its consumption cannot be stimulated. And whereas the first man may have been operating a mine two hundred days in a year and making money, the work of the second man cuts that



down to maybe one hundred and twenty-five days while the second man gets seventy-five days.

As the region round about the two men grows, the days on which they can operate their mines increase until it comes to the point where a third man enters the business and causes the first two to suffer.

So it goes increasing in proportions year after year. But it does not reach the point where any large number of mines can operate throughout an entire year. Somebody is always cutting in and making competition keen. A coal mining industry has grown up under such circumstances and as the demand for coal has increased during the past one hundred and fifty years and transportation has increased, the opening of coal mines has been carried out into regions where there is only coal and nothing else. And as the coal industry has grown, men have grown up in it so that they know only how to mine coal and nothing else.

As the industry has grown so that men devote their whole time to it, changes have come over the underground operation of mines. There is a mine which has operated for a hundred years and has undergone most of the changes. In 1836, when the known history commences, the coal was mined near to the outcrop. As the seam was twelve feet high, it was possible to drive a horse and cart into the chambers along the crop and loading the coal, drive away and deliver it to customers. The same thing is probably going on in many a wagon mine today. But in this particular mine the coal as it went into the ground, dipped slightly so that after the opening had gotten in some three hundred feet, there would be too much water to contend with and another place would have to be started from the crop.

After pumps came into use, the mining could be extended farther. Then it became necessary to use cars on rails to get the coal to the surface. Wooden rails were first used just as they were first used on railroads. Mules and horses were used for hauling the cars. As the mines became deeper, it became necessary to have artificial ventilation. First chimneys were used to cause a draft. A fire would be built in the bottom of the chimney which would be tightly connected to an opening in the mine and the hot air rising in the chimney would draw fresh air into the mine.

As animal haulage permitted mining to some depth, fans operated by engines finally had to be employed. As engines were developed, shafts could be sunk to reach coal which could not be mined from an outcrop.

Finally the limit to animal haulage was reached and motor haulage was installed, so that the distance to which mining can be carried nowadays is that to which air can be forced.

The distances in a mine a hundred years ago were a few hundred feet. With mule haulage it was a mile. With motor haulages it is now three and four miles. One can understand how the capacity of mines to produce coal has increased, if one knows that the mining is carried on on the periphery of a circle whose radius is the distance of transportation.

These changes which have been detailed are all changes in the service of mining, not in the actual loosening of the coal and especially not in the loading of it into the mine cars which is still done by hand; six hundred and fifty million tons a year

In mining proper the changes have come from the use of powder and during the past twenty-five years, while the use of electricity has been growing, for the primary undercutting of the coal, machines have come into majority use, taking that part of the work away from the hand miners and breaking up that much of the craft work.

In the lay out of mines the changes have not been great. The room and pillar method which started with the original mining when everything was craft work, is still the customary method. Only in the regularity with which the rooms are laid out and in the maps and plans used to maintain the lay out, has much change come. In attempting to devise machines to do away with the hand work of mining, people have clung to the room and pillar method instead of attempting at the same time to change the method of mining so that machine and mining methods would suit each other.

It is easy to understand why a machine to replace the miner has not been developed. For mines cannot be made over the way buildings can be made, and room and pillar work stands up better under intermittent operation. Moreover, the intermittent operation has not been conducive to expensive experiments, so that the attempts have been made to fit the machine to the

mine. So far as I know it has not been successfully accomplished.

Other changes have come over mining in things which are attendant to mining. During the past fifteen years "Safety First" has won its fight so that it is no longer a despised thing. Good equipment for safety is now a thing to be proud of. Welfare work has also a firm hold and one can find much better mining towns than one ever could in the olden days. Some of the towns, such as those of the Colorado Fuel and Iron Company, represent a wonderful change. But for most mines there still remains the necessity of keeping the initial investment to the lowest point, for in the words of the majority report of the 1920 Bituminous Coal Commission, "The coal industry, which was speculatively over-developed before the war, is still more over-developed now."

One must remember one essential thing about mining, a thing which never can be changed any more than the character of the coal can be changed,—its isolation.

That isolation makes welfare work more important in coal mining than in other industries. The work of a manager of a mine does not continue through the ordinary eight hours. His is a twenty-four hour job. His is often a responsibility for the activities of a complete community.

Most coal mines are situated along branch railroads in little towns where the only work carried on is mining. Mines cannot be crowded together as manufacturing plants can be. They have to be located where the coal exists and where it is easiest of access. Mines cover large areas, several hundred—a thousand—fifteen hundred acres, and the distances between are measured in miles. This separation makes for loneliness for any person in charge of a mine.

Superintendents and foremen belonging to the same company may only see one another a couple of times a year, if as much as that, and talking over common troubles is not often possible. And in the isolated community there are no chances to enjoy those pleasures which the man in a different community thinks of as necessities. A boss is isolated in an isolated community.

Coal mining companies have to build the towns. There is nothing to attract outsiders to invest money in houses and there is no attraction for a workman to build a house when he is insecure in the tenure of a job with one company. If he loses that

job he must move all his belongings—all his household goods and his family as well—to the next town. It is not advantageous for a miner to own more than can be packed in a suit case and to have a family is a real disadvantage. Out of a job and it is a mile or two to the next mine and if there is no job there, then it is a couple of miles to the next mine and so on. There may not be another job within ten or fifteen miles—maybe fifty.

Perhaps a miner does not get fired from his job. Coal mining work is always intermittent; never regular. Perhaps some accident occurs and the mine shuts down for a length of time for some cause, then the man must find work and the possession of furniture is a bad load. It is rarely that one finds a miner who has not wandered around—mostly because he has been compelled to. There is nothing in coal mining to induce a man to stay in one place.

The practical rule for the workers in the mines is never to own more than can be packed in a wagon. For the engineers and managers of mines the rule of their lives is never to buy a house.

Of the mining town, the Bureau of Labor Statistics (Monthly Labor Review, April 1920) has this to say:

"The average company mining town has few of the amenities of ordinary community life. There is a dull uniformity in the appearance of the houses and an absence of trees and natural vegetation. Streets and alleys are open dirt roads almost without exception. Sidewalks are very rare.

"The rents of the miners' houses are comparatively low, most of them (12,343 out of 18,887, or 65.4 per cent) renting in 1916 for less than \$8.00 per month. The rent in some instances probably constitutes a subsidy to the wages of the miner who lives in a company house. (What proportion of all bituminous coal miners live in company houses is not known.)

"The chief characteristic of every mining town is its uniformity, due to a tendency to erect houses of similar plan and type and to arrange them along rectangular lines of survey. Another feature of the mining town has been its disregard of the advantages of planting trees, grass, and shrubbery as beautifying elements.

"The desirability of locating the houses near to the mines has frequently been secured at the sacrifice of the conditions of health and comfort. . .

"The prevailing size of dwelling for a family in the Pennsylvania and West Virginia bituminous coal regions is either three or four rooms; in the Ohio and Indiana coal region, four rooms; in Alabama, Tennessee and Kentucky, three or four

rooms; and in the coal towns of Colorado and Wyoming, four rooms.

"Sanitary conveniences are rarely found in mining towns. Thus in the soft coal regions, only 312 dwellings, or 1.9 per cent of the 16,896 reported, have inside toilets, while 16,584 or 98.1 per cent have outside toilets.

"There is an absence of careful maintenance in company controlled mining towns. Except in a few striking instances, there was no garbage collection or provision made for garbage disposal in thirteen of fifty-three communities. Ten companies reported collecting garbage in the community bi-monthly or less frequently.

"Workers in the bituminous coal region of Pennsylvania commute from neighboring cities as far as seven miles away.

"On the side of the employee it may be observed there is frequently a reluctance to make any demands for proper maintenance and improvements in the house, particularly when labor is plentiful and competition for jobs is keen, because of the inevitable control which the employer has over the employee by reason of owning the house and holding over him the threat of eviction.

"Almost without exception all houses are rented and not sold by the mining companies."

For one hundred and fifty years they have been the same. To quote from Hammond again:

"From the letters of Mrs. Montagu, the famous blue-stock-ing, herself a colliery owner, we learn the impression the collieries made on their employers in these early days. 'The Tyne Vale where I live,' she wrote in 1775, 'used to look green and pleasant. The whole country is now a brown crust, with here and there a black hole of a coal pit, so that I cannot boast of the beauty of our prospects. As to Denton, it has mightily the air of an ant-hill.'"

A person visiting a mine and not going underground, will see only a small fraction of the work. The main feature of the surface plant is the tippie. It is not a complex building, mostly a trestle. The cars as they come from the mine are run onto the tippie and after the coal has been weighed and credited to the individual miners, it is dumped from the mine cars into the railroad cars underneath.

Grouped around the tippie will be found the power houses and the repair shops and the supply shanties and the office. In each of these a couple of men will be working. There are not many men in the surface plant of a mine; maybe 10 per cent of all the men. But it is out in the daylight where every man can be easily seen.



Near the surface plant of the mine will be found the mining town and the company store, all of it stretched out along the railroad track. The manager of the mine is the virtual ruler of this community.

### *Profits*

It is best to leave to others any arguments concerning the profits of mining coal. There is plenty of evidence that in normal times when the railroads have capacity to transport all the coal which can be consumed, that coal has been produced at a very narrow margin of profit or at a loss. Only when railroads have been over taxed, has the price risen so as to assure a profit in production. Common sense would indicate that when soft coal mines can only work three days out of four even in the boom periods of high demand and during ordinary times much less than that, that competition in selling coal must be keen and prices as low as possible.

That narrow margin of profit or none has a most serious consequence upon the workers in the soft coal mines. For with the coal companies, because of the isolated situation of mines, compelled to supply the means of living, there comes an economic pressure to obtain a rebate on the wages paid to the workmen from the profits made through the rent of houses and particularly through the operation of the "company store." When regions develop so that there exists a population employed in work attendant upon mining, such as railroading, then other stores than the company store are likely to spring up. In such circumstances if a workman trades at other than the company store, the rebate on wages is not received. The economic pressure then tends toward the compelling of the men to trade at the company store, resulting in the firing of those who do not trade, or the deduction of a certain amount from their pay.

It has been so since 1765 when Richard Atkinson wrote that the overseer "constantly keeps a shop contiguous to the pit, where he lays in every necessary both for the belly and the back, and obliges the poor men to buy whatever they want from him, stopping it out of their wages."

Only in the anthracite region of Pennsylvania is there a contrast to this. There the company store has virtually disappeared. But there are only 480 square miles of such coal, while there are

hundreds of thousands of square miles of soft coal. This limit of quantity has ended the over development of mines, making profits from mining possible.

The result of the over development of soft coal mines and the consequent narrow margin of profit from mining, is that the workman in the mines must struggle not alone to maintain his wages but from becoming an economic slave. The economic conditions inevitably induce such a situation. It is that which makes for so much bitterness in the industrial troubles.

The assurance of profits to the operators of mines would relieve this economic pressure and be advantageous to the worker.

There are mines where the seams of coal are high and free from dirt and the roof is good and the position of the seam is such that the water will flow out of the mines, while the grades are in favor of the loaded cars. The man in charge of a mine cannot change the character of the coal or its position. He must take it as he finds it and struggle against the luck of his conditions. Under the most favorable conditions profits can be made with the simplicity of the original way of mining where hand miners dig out the coal and the only equipment needed is mules and track and mine cars. During idle times expense is small.

The handicap of unfavorable conditions is made up by the employment of machinery, by motors for haulage, and mining machines for undercutting the coal and by pumps to take care of the water. The expense of idle days may be high.

With the introduction of machinery the problem of the mine management becomes complicated. For the manager must be engineer as well as manager. Though half the coal of the country comes from mines producing a considerable tonnage, the average mine has a capacity of about ten railroad cars a day; about five hundred tons. With large mines or in companies operating a number of small mines, specialists can be employed to take care of the details of the electrical and mechanical apparatus. But for many companies the man in charge will be expected to know many branches of engineering.

The need of the operator of a mine is for a man possessing super-human knowledge as well as energy. At the same time with intermittent operating time he cannot pay as much as he could when operating steadily. The manager of a mine will not only be expected to have a knowledge of pumping so as to take care of any accident when pumps go wrong and the crisis

of relentlessly rising water endangers the existence of the mine, but he must know the electrical end of the pumps and he must know the transmission of power and its development through generators, steam engines and boilers. He must also know mining engineering and how to organize work. Mines are not located where specialists in any line can be quickly turned to. Minutes are valuable when accidents happen underground. The mine manager must rely upon his best wit. And accidents are frequent. No wonder is it then that preference is given to machinery which is clumsy and simple, machinery that can be repaired without special tools. Nor is it any wonder that often when machinery is installed with the high hopes of cutting mining costs, it is found that costs have gone up instead. Installation of machinery demands not only a knowledge of the power used but also an organization of work which craft work does not require.

Coal mining does not require a knowledge of some things which metal mining does require; a knowledge of geology and metallurgy. On the other hand it does require a greater business and economic knowledge. For a mine manager is likely to be a store manager as well and be required to oversee the purchase of everything from blackberry jam to ladies silk hose.

It is only fair to the managers of many mines to state these things. For under the circumstances of their work, it is difficult for them to do other than they do: worry the job through to the best of their ability. They rarely know when or for how long the mines are going to work and the costs which they must strive to meet are set by those mines which are most favorably located.

The most disheartening thing which a mine manager, seeking to make a favorable record, goes up against, is intermittent operation consequent to overdevelopment of coal mining as a whole. One cannot accomplish much when there is no work.

That overdevelopment has been compounding upon itself for a number of years until now the mine manager must face the situation that there is likelihood of more idle time than operating time. This compounding is well explained by Mr. F. G. Tryon who is in charge of coal statistics of the United States

Geological Survey. It is worth while quoting from him at some length.<sup>1</sup>

"Early in December, 1920, when production was very heavy, the mines averaged less than 75 per cent of full time. The estimated present capacity of the mines and working force is at least sixteen million tons a week, yet the maximum ever produced in a single week was 13,146,000 tons. In other words, our mine capacity and labor force are not only greater than the average need but they are much greater than the maximum need. To borrow a phrase from power engineering, our mine plant not only has a bad load factor but it is much larger than is needed to meet the peak load.

"So great an economic waste challenges attention. Before considering, however, the measures which have been proposed to prevent it, the causes underlying the inflation of capacity beyond even maximum requirements must be understood.

"The area underlain by coal in the United States is enormous (four hundred and fifty-eight thousand square miles), and a great part of the coal bearing land east of the Rockies has been taken up in small tracts for farming or for other purposes before its value for coal was known. In the East it is becoming increasingly difficult to find a block of unoccupied coal land at once close to transportation facilities and big enough to support a large modern operation, but until recently there was room for all comers. To suppress competition by buying up the reserves has therefore been impossible. In fact, the wide dissemination of ownership in itself has tended to stimulate development, for each possessor of coal-bearing land wishes to realize on his holding.

"The coal beds are generally thick, lie nearly flat and are but little faulted. They are readily accessible from slopes, drifts or shallow shafts. Under such conditions, although a large modern mine may involve an investment of capital running into millions, it is possible to open up a small mine at low initial expense. The capital required may often be raised locally, partly because of the 'jingle fallacy,' which has deceived so many investors in mining enterprises—the fallacy of thinking that 6 per cent on a mining stock is the same as 6 per cent on a mortgage and neglecting to write off the depletion. The nature of the resource has thus encouraged overdevelopment. In addition, transportation—no less important—has been guaranteed the new enterprise. The factor limiting output in a time of high prices usually has been car supply; at such a time anybody with cars to load could sell coal. No matter how overburdened the railroad serving the coal field might be, it has been obliged by law to put in a siding and supply cars for the new operation. The opening of the new mine does, indeed, dilute the car supply of

<sup>1</sup> Injurious Effect of Irregular Operation of Bituminous Coal Industry  
F. G. Tryon. *Coal Age*. July 7, 1921.



the entire region, but the operator can count on his pro rata share of the cars available.

### *Incentive Required for New Development*

"The factors necessary to new development—coal lands, capital and transportation—therefore have been easy to bring together if a sufficient incentive was present. The incentive has been the periodic recurrence of high prices. Coal is a necessary of life for which substitution on a significant scale is impossible. The demand for it, therefore, is highly inelastic. Moreover, when a scarcity exists the bidding for emergency supplies is concentrated on the limited margin of 'free coal'—that is, coal not under contract. No one knows just how much of the output is under contract and how much is available for spot purchase, but normally, over the country as a whole, the proportion of spot coal is perhaps 25 per cent. The moment production is interfered with, however, the margin of spot coal shrinks. At the same time the number of persons who want to buy spot coal increases, for many who thought themselves protected by contracts find their contract deliveries curtailed and have to enter the spot market.

"The interaction of these two principles—the inelasticity of demand and the contraction of the spot tonnage in times of scarcity—brings it about that even a slight maladjustment between supply and requirements may produce a spectacular rise in the spot price, such, for example, as took place in the summer of 1920. These higher prices in times of active demand apparently were the prime incentive to the new development which has kept the mine capacity so far in excess of possible requirements. Although in comparison with the war years prices before 1916 seem modest indeed, the spot price would rise almost every year to attractive levels during the limited period of brisk demand, and occasionally, as after the anthracite strike of 1902, even contract prices would rise well above the cost of production.

"The inflation of mine capacity in times of high prices has been strikingly demonstrated in the last five years. Since 1915, when the spot price began to rise sharply in response to the war-time demand, there has been an extraordinary increase in capacity. In 1915 the annual capacity of the soft-coal mines was about six hundred and seventy-five million tons. Today it is certainly eight hundred million tons, and there is evidence pointing to a figure of nine hundred million tons. The increase in five years, therefore, has been between one hundred and twenty-five million and two hundred and twenty-five million tons, or between 19 and 33 per cent. The increase has been particularly marked during the last twelve months. It is not due alone to the opening of new wagon mines or the reopening of old mines long abandoned. It means also a new development of work, new equipment, and new mining machines at properties already established. A significant change has been the increase in the



number and output of steam-shovel strip pits. The aggregate effect of these influences on capacity has been great, and the bituminous industry probably was never more heavily over developed than it is today.

### *Factors That Combine to Inflate Mine Capacity*

"The lure of occasional high prices was what enticed new companies to enter the field. When they were once in, other forces compelled additional development. The necessity of pushing development in order to be able to meet carrying charges on extensive investments in coal lands was pointed out years ago by Walker. Either for speculative purposes or to anticipate their competitors, many companies have acquired coal lands far in excess of the reserve they needed for their mines. The recurring interest on those investments must be paid in cash, and often the only way to raise the cash is to open more mines and sell more coal. Every new mine means dilution of the demand and of the car supply in times of shortage, and consequently a slight decrease in the working time at the mines the company is already operating. But the company knows that the new mine will be allotted its share of the available cars and that most of the dilution will be passed on to its competitors. Under these conditions the tendency to new development proceeds as inevitably as the physical process of osmosis.

"These factors combine to inflate mine capacity. At this point another factor enters in which impels the owner to operate his property as near to its capacity as he can, even when the price is low. As Walker further pointed out, the individual operator cannot curtail his output without increasing his costs, and when the margin of profit is small he dare not increase his costs. The extra amount of coal produced by him has 'much less effect in depressing the market price than in diminishing his own costs,' and he is therefore compelled to continue to sell coal on the narrowest margin, or perhaps at a loss.

"The picture is not complete without a reference to the evil results of overdevelopment and overproduction when the price is deflated. The abounding prosperity enjoyed by the coal industry during the war years and in 1920, when a combination of circumstances kept prices high, is likely to make us forget the conditions of 1914-1915. At that time the market was depressed, and competition forced prices down below the cost of production. Rather than abandon his mine, many an operator sold coal at prices barely above the immediate cost in labor and materials, and below cost when reasonably computed. Coal-mine credit was poor and many companies went into the hands of receivers. There is abundant testimony that most of the time before the war the industry was operating on a very narrow margin of profit. It is such competition as this that makes inevitable the wasteful methods of mining which in many of our

fields leave half the coal behind in the ground in a manner that renders its ultimate recovery very unlikely.

"Mining on an extensive scale, at least, is of necessity a continuous operation. Unless roof and bottom are unusually stable any long interruption to operation invites disaster. Furthermore, in the Appalachian region, where the greater part of the coal is produced, most of the mining towns are far from other industries. The typical mining settlement of West Virginia is in a narrow mountain valley, where space for even gardening around the houses of the employees is scanty."

The confirmation of Mr. Tryon's estimate of a yearly production capacity of nine hundred million tons, is found in the weekly report of the United States Geological Survey for October 15, 1921, in which the estimate is given that during the week ending October 1st the mines operated 49.3 per cent of full time and produced nine million one hundred and five thousand tons. This equals a full time capacity of eighteen million four hundred and fifty thousand tons a week or a yearly capacity of nine hundred and sixty million. The week's previous production was at the yearly rate of nine hundred and seventy-four million tons for full time operation. The production of the world is only a billion and a quarter. For the year 1921 as a whole, operating time has been about 40 per cent of full time and production has been at the rate of about four hundred million tons a year.

These figures do not take into account any increase in capacity to produce which would follow better organization of underground work. It is hard to estimate how much increase in capacity could be obtained but it is certainly considerable, between 25 and 50 per cent.

No one knows exactly how much consumption there is for a year. The highest production of soft coal alone for the United States has been five hundred and seventy-eight million tons. The demand during 1921 has been at the rate of four hundred million tons. Probably for a normal year it is around five hundred million tons. So one sees that for a boom year the overdevelopment amounts to 60 per cent; for normal years 80 per cent and for years of depression 125 per cent. The uncontrolled economic pressure is such as to inflate this overdevelopment.

The inflation of the development of mines has made the cost of production of bituminous coal more than is necessary. The report of the Engineers Committee of the United States Fuel

Administration contains a chart<sup>1</sup> showing the increase in total cost with decrease in operating time. The average operating time for past years for the country as a whole has been 70 per cent of full time. For such a per cent of operation the cost is increased, according to the information on the chart, by 20 per cent. With the present capacity of the mines at nine hundred million tons and normal demands around five hundred million tons, mines cannot expect to average as much as 70 per cent, more likely 60 per cent. The cost of production then is increased 29 per cent. With costs of production around \$2.00 a ton, the cost for idle days amounts to 40 to 60 cents a ton. On half a billion tons this amounts to some sum between \$200,000,000 and \$300,000,000 a year. It is a cost which must be paid by the consumer.

Such an estimate of unnecessary cost only takes account of the money expended in maintaining a mine on idle days. It does not take into account the unnecessary cost of production that is involved in the customary manner in which the underground work is organized. The savings in production cost which could be effected with steady operating time are not easily measured. The probabilities are that they amount to as much or more than the cost of idle days.

There is another cost of overdevelopment and consequent intermittent time which has no measurement in dollars and is not paid by the public. It is the effect of irregular work upon the men in the mines, and not alone upon the men but upon their wives and their children. That is a cost which is paid by those whose life is mining. It, too, is an avoidable cost but it is not one which those who mine can escape paying so long as overdevelopment is free to compound upon itself. It is the result of forces too large for individual operators to control or for lonely groups of men.

In speaking of the effect of the "psychological factor of irregularity" of the operation of mines, the Bituminous Coal Commission of 1920 expresses the hope that "it may be expected that it will disappear in large measure as the industry becomes more stable." How the industry may become more stable is hard to comprehend. The demand for coal has increased in the past at the rate of ten million tons a year. At that rate it will take

<sup>1</sup> Plate 61.

forty years before the present overcapacity to produce amounting to four hundred million tons has been taken up.

If one takes a lesson from the anthracite fields of Pennsylvania, one finds that the stability in that industry was only of benefit to the men in the number of days of work in a year and that it did not change the factor of the irregularity of hourly work during the day. The steadier working time came gradually in the anthracite fields as consumption caught up to production capacity. At one time this field was overdeveloped and produced in the 1870's the famous industrial troubles of the Molly Maguires. While this industry gradually steadied, the men who had been brought up during the days of irregular operation remained in control of work and as workmen in the mines. The customs of irregular work have been carried over into the time of steadier operation. The same faults of the engineering of the organization of work can be found in anthracite as in bituminous, only in a more complex form as the ground conditions are more complex. Moreover as mines cannot be made over the need of using the best knowledge obtainable from the very beginning of a mining operation is no where better shown than in the anthracite fields. For there with many seams of coal lying on top of one another, it has often been necessary in order to mine the coal from thin seams, to repeat the unorderedly mining of thick seams, which were mined fifty and sixty years before.

More than regularity of work is needed for the mines to be of full benefit to the workers. The need is for the expansion of the engineering of mining so that there is a balance and coordination in underground work. The benefits which will come from it will accrue to the men in the mines and to the cost of production. In factory work this engineering is in full swing of development. In coal mining it is not. It is an engineering of work in contrast to the engineering of machines. An engineering of a whole in contrast to the engineering of parts.

An example of a simple problem of such engineering occurred at a bituminous mine, where the main haulage, which was the factor limiting the output and to which all the rest of the organization needed to conform, was an endless rope. There were four districts inside the mine to which cars were delivered. The rope had a capacity of three trips an hour of forty-two mine cars each, making a total capacity of one thousand cars a day or one thousand four hundred tons at an average car weight of



one ton eight cwt. At the time of the inspection the output was between eight hundred and nine hundred tons a day and the excuse given for its not being greater was that there was a good deal of delay at the tipple, where the mine cars were emptied into railroad cars, owing to the fact that there were not enough mine cars at the mine. There were only three hundred and ten. On this account, at the end of each trip, the rope had to wait until some cars were dumped. For if enough cars were kept at the tipple outside of the mine to give a trip without waiting, then there were not enough cars inside to go around among the loaders. The real reason why the output was not obtained was not that stated. There were employed in the four districts inside the mine thirty-eight, seventy-five, ninety-one and sixty-two men respectively or a total of two hundred and sixty-six men. The forty-two cars in a trip did not divide evenly into these numbers and the three hundred and ten cars minus the two hundred and sixty-six men left only forty-four cars for the rope and for extras. As each loader could have loaded at least seven tons a day, the seven divided into the capacity of the rope—one thousand four hundred tons—indicated that only two hundred men ought to have been employed, or that there was an over-equipment of sixty-six men in proportion to the machinery. When later the number of loaders had been lowered to about two hundred and ten, the output increased to twelve hundred tons and no more mine cars were needed. As coal mining is a tonnage proposition the cost went down as the output went up. Moreover investment in equipment was saved.

And the men in that mine, through the proper proportioning of their number, obtained a better opportunity to work and to earn. The conditions on days when the mine worked were made favorable for them and not only for them but for the mine foreman as well, in that he had fewer men to oversee. The work became regrouped and organized and tended toward conditions where men can work contentedly. For, as a larger tonnage per miner was obtained, larger earnings were obtained by the individual men.

Ultimately, however, in order to carry the best benefits to those whose life is coal mining and to eliminate avoidable costs, there will come the necessity of engineering the organization of the work of all the mines similar to the need of the organization of the individual work in a single mine. It is upon that



organization of the work of mines that the public can have its effect, so that mines shall operate under the most favorable conditions and not suffer from unemployment. It is an organized control of the industry. It is for those within the coal mining industry to translate the favorable opportunity of the mines into favorable opportunity for the men in the mines, that they do not suffer from a low output per man consequent upon unemployment within employment.

Two quotations throw into relief the situation which now faces many of the workers within bituminous coal mining.

Mr. Edwin Ludlow, President of the American Institute of Mining and Metallurgical Engineers, has stated in the Proceedings of the Institute: (April 1920)

"The history of a majority of bituminous mines, especially of the mass of small mines that go to make up the aggregate tonnage of the country, is that some successful salesman who has been selling coal on a commission for other mines feels the necessity of having a mine of his own to stabilize his business, and arranges either by the formation of a company or through his own capital to purchase or open up such a mine. He then appoints what he considers a good practical man to take charge of it. In the majority of cases this means the appointing of a superintendent who has been a foreman at some other mine. He is not an engineer, and as he is expected to mine coal at the least possible cost, he works the mine on that basis, taking out the best coal and leaving coal for a roof when it is cheaper to do so, than to take it down and timber. The work is usually without definite plan. The engineers who go into the mine are simply surveyors who record what work has been done, but are not employed to project the future workings.

"The selling end of the bituminous business has been the money-making end, and the majority of mining companies are only adjuncts of a sales company."

In the majority report of the Bituminous Coal Commission (1920) is the statement: (page 26, paragraph 6)

*"Full time employment in the coal mines can not, therefore, be expected until the industry is put on such a basis that only those mines remain in operation whose output is required to supply the annual needs of the country."*



# INDEX

- Absenteeism, 12-13, 39, 42, 63, 111
- Accidents, 36, 49-50, 71. *See also* Safety
- Agreements. *See* Trade agreements
- Air course, 23
- American Economic Review, quoted, 124
- American institute of mining and metallurgical engineers. Transactions (quoted), 54-6, 69-71, 114, 116, 145
- Atkinson, Richard (quoted), 8-9, 12, 135
- Back heading, 23
- Bituminous coal commission (quoted), 3-5, 53-4, 62, 111-12, 132, 142, 145
- Blasting off the solid, 29
- Bradley, J. G. (quoted), 13-14
- Break-throughs. *See* Crosscuts
- Bureau of labor statistics on Housing, 133-4
- Bureau of labor statistics on Wages and hours in coal mining industry, 59-60, 63-8
- Car supply, 48-9, 61-3, 102, 105-6, 118-19, 143-4. *See also* Haulage; Transportation
- Central Competitive Field, 7
- Certificates of foreman, 37
- Check weighman, 6
- Cleaning coal, 29, 48, 119. *See also* Dirty coal
- Coal beds, 20-1, 138
- Coal mining—Description, 1-2, 19-33, 129-31
- Collective bargaining, 7, 113. *See also* Trade agreements
- Colorado fuel and iron co., 6-7, 132
- Company houses. *See* Housing
- Company men, 28, 30-1, 57, 93-4, 117
- Company stores, 6, 135-6
- Complaints. *See* Grievances
- Costs, 16-17, 74, 125, 136, 141-2
- Crawford County Mines 76-7
- Crosscuts, 21-5, 95
- Cushing, George H. (quoted), 124-5
- Darkness, 27, 31, 41
- Dead work, 6, 120
- Demands of miners, 3, 6, 112, 132
- Dirty coal, 106-8, 119. *See also* Cleaning coal
- Drift, 21, 26
- Drivers, 28, 44, 46, 48, 117-18
- Earnings. *See* Wages
- Engineers. *See* Mining engineers
- Entries, 21, 23, 33
- Face, 25
- Fairmont District, 123-4
- Faulty place, 99-100
- Fines, 106-8
- Fire boss, 35-6
- Foreman. *See* Mine foreman
- Four hour day, 79-80
- Freeport District, 121-4
- Free turns. *See* Turns
- Fuel administration, 141-2
- Geological survey. Weekly report on production, 56-9, 141
- Ghosts, 31
- Gob, 26, 48
- Grievances, of miners, 1-10, 80-2, 93-110, 125-7; of operators, 10-16; of public, 16-18
- Guards. *See* Mine guards
- Hall, R. Dawson (quoted), 71, 116
- Hammond, J. L. and Barbara (quoted), 8-10, 134
- Hand mining. *See* Pick mining
- Haulage, 21, 28, 131, 143-4. *See also* Car supply; Transportation
- Heading, 21, 23
- Hocking Valley district agreements, 45
- Hoover, Herbert (quoted), 54, 115-17
- Hours of labor, 3, 5-6, 55-68, 79-80, 112. *See also* Lost time
- Housing, 132-4
- Idleness, 9, 12-13, 80, 110-11. *See also* Unemployment
- Illinois coal operators association. Monthly bulletin, 80-2, 93-110, 125-7
- Isolation of mines, 7, 38, 132
- Labor turnover, 91, 111
- Laws. *See* Mining laws
- Layout of mine, 22-4, 47, 131
- Leshner, C. E. (quoted), 14-16
- Loaders, 30, 61, 66, 67-8, 74-5, 98, 103, 108, 123
- Long wall, 20
- Lost time, 53-92, 96-9, 111-16, 123-4, 127. *See also* Absenteeism; Hours of labor; Unemployment
- Ludlow, Edwin (quoted), 70, 145

- McAdoo, W. G. (answered), 13-14  
 Machine miners, 29-30, 61, 65, 67, 83, 84, 87, 88, 97, 103, 108, 124  
 Machinery, 29-30, 48, 131, 136  
 Manning, Van H. (quoted), 114  
 Measuring day, 51, 120-1  
 Mine foreman, 35-52, 91-2, 115, 120, 132, 136-7  
 Mine guards, 6-7  
 Mine inspectors, 17-18  
 Mine records. *See* Records  
 Mining engineers, 113-14. *See also* Mine foreman  
 Mining laws, 6, 17-18, 21, 32, 36-9  
 Mining terms. *See* Terms
- National Coal Association. Bureau of coal economics (quoted), 121-3  
 New York Times (quoted), 12-14
- Old works, 27  
 Organization of work, 3, 11-12, 39-52, 60, 98, 107-8, 112-13, 125, 144-5  
 Output. *See* Tonnage  
 Overdevelopment, 54, 80, 115-16, 136, 137-42
- Panels, 23, 25  
 Passing branches, 28  
 Payment for work, 29-30, 51, 117-21. *See also* Wages  
 Peale, Rembrandt (quoted), 53-4  
 Pick mining, 29, 48, 61, 64, 67, 74-5, 82, 84, 86, 88, 118  
 Pillars, 20-25  
 Pit committee, 104, 108-9  
 Prices, 16-17, 140  
 Production, 71, 141. *See also* Tonnage  
 Profits, 14-15, 135, 140  
 Public, Grievances of, 16-18  
 Pumping, 130
- Recognition of union, 6-7  
 Records, 38, 46, 63, 115  
 Reinstatement in job, 102  
 Robinson, H. M. (quoted), 53-4  
 Rock falls, 49-51, 81, 100, 120-1  
 Rooms, 20-6, 47, 104-5, 118, 131
- Safety, 17, 36-7, 49-50, 71, 132. *See also* Accidents  
 Seams, 20-1  
 Shot firers, 50-1  
 Side entries, 23  
 Slacktime, 118  
 Smith, George Otis (quoted), 54-6, 70  
 Solid. *See* Blasting off the solid
- Stabilization, 54-6, 69, 112, 116, 143, 145. *See also* Overdevelopment; Unemployment  
 "Statement of facts," 15-16  
 Stores. *See* Company stores  
 Strikes, 6-10, 106, 109
- Terms, 20-32  
 Thatcher, Arthur (quoted), 69-70  
 Timbering, 19, 119-20  
 Time lost. *See* Lost time  
 Tipple, 134  
 Tonnage mined, U.S., 16, 139  
 Tonnage per man, 69-92; Illinois, 72-3, 80-2; Kansas, 75-8; Ohio, 73; Pennsylvania, 73-4; Washington, 78-9  
 Tonnage per mine, 32, 62  
 Trade agreements, 3-4, 7, 45. *See also* Collective bargaining  
 Track laying, 104  
 Transferring miners, 49, 102  
 Transportation, 43-6, 61-3, 117-18. *See also* Car supply; Haulage  
 Tryon, F. G. (quoted), 137-41  
 Turnover. *See* Labor turnover  
 Turns, 45, 62-3, 85, 89, 102
- Undercutting coal, 29-30  
 Unemployment, 3, 53-92, 96-9, 111-13, 133, 142-3, 145. *See also* Absenteeism; Lost time  
 U.S. Bituminous coal commission. *See* Bituminous coal commission  
 U.S. Bureau of labor statistics. *See* Bureau of labor statistics  
 U.S. Fuel administration. *See* Fuel administration  
 U.S. Geological survey. *See* Geological survey
- Ventilation, 21, 130-1
- Wages, 3-9, 13-14, 36, 80, 91-2, 94, 113, 121-4. *See also* Payment for work  
 Wash houses, 107  
 Washington annual report, quoted, 78  
 Waste, 15  
 Welsh miner's story, 50  
 Welfare work, 132-3  
 West Virginia coal association, 13-14  
 White, J. P., 4-5  
 Wholesale coal association, 124-5  
 Windy shots, 50  
 Working conditions, Classification under, 102  
 Working face, 50  
 Yardage, 51, 95, 119  
 Zinc mining, 69-70









